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UNITED STATES TARIFF COMMISSION

WASHINGTON

THE WOOL-GROWING INDUSTRY

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In the preparation of this report the Tariff Commission had the special and equally helpful services of Mr. Mark A. Smith, Mr. George P. Comer, and Mr. Louis G. Connor of the Commission's staff. In addition, assistance was rendered in field investigations and in the preparation of the text by Mr. J. S. Cotton and Mr. Harry Petrie in the United States, and of Mr. and Mrs. Albert Schofield in South Africa; Mr. W. I. Carney and Consul General Alfred A. Winslow in New Zealand; Mr. A. W. Ferrin, trade commissioner of the Department of Commerce, in Australia; and Consul General W. Henry Robertson in Argentina.

THE WOOL-GROWING INDUSTRY.

SUMMARY.

The war period was one of important change in woolgrowing, as in many other industries. This report deals with the development during the war years, but it also contains the elementary facts necessary to understand the industry in its economic relations. It deals with the problems of domestic woolgrowers, and with the fundamental tendencies in the industry at home and abroad. Domestic production costs of at least suggestive value are included, and some foreign cost figures also are presented. This report may be regarded as a continuation of the study of the industry made by the Tariff Board in 1911, the results of which were published in 1912 as "The Report on Schedule K." This volume deals, however, only with the raw material and not with the manufactures of wool.

CURRENT SITUATION.

The end of the war found large stocks of wool in the world, especially in Australasia, South America, and South Africa. There was an immediate fall in price of domestic wools, the result of cancellation of Government orders which had monopolized the mills. However, with the exception of medium and low wools, prices had returned to approximately the November, 1918, level by June of 1919. Then an extremely active demand for fine goods, one of the remarkable economic facts of the period, sent the price of Merino wools to new high levels. On the other hand, after midsummer of 1919, the price of medium wools at first sagged slowly, that of low wools, more rapidly. On the whole, it may be said that the clip of the United States was marketed to good advantage in 1919, and marked changes in demand became noticeable only in the fall, after the wool was mainly in the dealers' hands.

A pronounced slackening in demand for medium wools then occurred, attended by decreases in price, and it soon appeared that low wools were difficult to dispose of at all. Accurate knowledge concerning the large stocks of wool in existence, information which had previously been lacking, was one of the chief factors in depressing the world market for medium and low wools during the latter part of 1919. At the same time, heavy imports of such wools, a part of which represented speculative purchases, continued during the late fall of 1919 and the winter of 1919–20. This, in addition to some other factors, soon to be mentioned, but which did not yet have very great effect, added to the stock of such fiber already on hand in the United States and further checked the demand for it in this country.

By the time buyers of the 1920 range clip began operating north of central Arizona, the market for wools below half blood was virtually dead. Few of the buyers would take the trouble even to inspect three-eighths blood and lower clips. They were competing sharply, however, for half blood and finer wools.

Then the domestic market for all wools, whether fine, medium, or coarse, collapsed. Range buying stopped very suddenly, and growers who had refused 60 cents or more for fine clips could rarely consign their wool and get an advance on it of half that much. The growers, dealers, and bankers conferred with the Federal Reserve Board on June 21–22 to ascertain whether some way could be found to finance the wool in order to hold it until a normal market, reckoned on at an early date, could be restored. It was decided at this conference to try to meet the situation by the use of bankers' or trade acceptances. However, the western banks and their correspondents had already used up practically all their rediscount privileges with the reserve banks. As the real value of the wool was with difficulty ascertainable, the only safe advance which could be made was that which prevailed in the trade. No more money could be secured by the new, and to the grower, cumbersome use of acceptances than by the familiar consignment method; therefore, acceptances were little used. The bulk of the wool which moved from range points was shipped on consignment, either to wool dealers or to wool commission houses. In the farming States the growers pooled an unprecedented amount of wool and either consigned it to commission firms or held it at country points. On September 30 it was estimated that probably 175,000,000 pounds out of the clip of approximately 250,000,000 pounds was still in the hands of the growers. The entire summer and fall, therefore, was a period of waiting and uncertainty on the part both of growers and of the wool trade in general.

The steady decline in the market for medium and low wools, as already suggested, was the result chiefly of the world "surplus" of those grades. The situation with reference to the sudden collapse of the market for all wools was only in part the result of this surplus. There were several additional factors, all of which were more or less closely related. They were (1) the so-called consumer's strike, i. e., the refusal of the public to continue paying the high prices demanded for clothing; (2) the consequent cancellation of orders placed with the mills; (3) an insistence on stricter limitation of credit to nonessential industries, and particularly to speculative holders of commodities, which reacted disastrously on the wool trade and led to more cancellations; (4) a part-time schedule or total stoppage of the mills which followed the cancellation of orders; (5) the world "surplus" of wool.

The consumers' strike, which was appreciably felt by a few merchants in the middle of 1919, became more evident by the following winter, and resulted in cancellations reaching the mills earlier and in much larger volume in the early summer of 1920 than the seasonal cancellations customary under normal conditions. Cancellations from Japanese customers, soon followed by similar action on the part of continental and American buyers, were reacting unfavorably on British mills almost as soon as the domestic cancellations began to affect our own.

The policy of the Federal Reserve Board as to credit curtailment was not directed against essential industries, and yet for several reasons the wool trade was unfavorably affected. Unable to secure money with which to buy the 1920 clip, the dealers could only take it on consignment at very low advances, and even these were made primarily in order to take care of their old customers on the range. Because of these low advances cancellations increased because buyers of cloth saw a chance to reorder from the mills at lower prices later on.

During this time the consumers' strike was spreading. By the middle of June it was estimated that 50 per cent of the orders previously placed with the mills had been canceled. That this estimate was approximately correct is shown by the failure of the mills to consume more than three-fifths as much wool per month after July 1 as was averaged during the preceding 12 months, despite some new orders and some renewal of former orders. Only the carpet mills have been operating at anything like full time. The rest have been running part time or not at all. For the fiscal year ending June 30, 1920, the consumption was 749,600,000 pounds of grease wool or grease equivalent, i. e., 62,500,000 pounds per month. From June 30 to date the monthly consumption has averaged approximately 38,000,000 pounds.

The world "surplus" of wool has been an important factor in the wool situation of the past season. The world stocks on hand as of September 1, 1920, which are reckoned in the trade as "surplus" at the time when active shearing of the clip for 1920–21 began south of the equator—amounted to approximately 1,250,000,000 pounds. This included the reported total stocks of Australian wools in the hands of the British Government on July 1 (revised to the probable stock as of September 1), and the reported stocks on hand in South America and South Africa. The probable average of monthly sales by the British Government from July 1 to December 1, 1920, was 100,000 bales of 330 pounds; and there was a monthly movement from South America and South Africa of approximately as much.[1] The surplus of old wools on hand December 1, therefore, amounted to approximately 1,050,000,000 pounds. However, the 1920–21 Australian clip is estimated to be 20 per cent (400,000 bales) short, i. e. 1,600,000 bales instead of the 2,000,000 in the 1919–20 clip. Quite aside from the fact that the 1920–21 clip has less length and a higher shrinkage in scouring than normal, and contains an unusual proportion of tender wool, all the result of the recent drought and all lowering the desirability and the value of the wool, the shortage in the Australian clip reduces the real surplus to about 917,000,000 pounds. This amounts to a normal Australasian clip, and represents about nine months normal prewar net annual imports of wool into the European countries south of Scandinavia and Russia and west of Turkey. Probably two-thirds of this surplus consists of wools below half blood, as graded in the United States, i. e., those qualities which the above countries usually import most heavily.

As a matter of fact, the above amount is not really a surplus, if the people of Central Europe are to be warmly clad in the near future. The exchange situation and the refusal of wool-holding nations to

[1] Shipments of new Australasian wools bought by foreign buyers at 1920 Australasian auctions neglected, as offsetting possible error in estimated movement from South Africa and South America.

·ts. They need further loans to carry them through the winter, they are heavily in debt after the trying season just closed, and :r assets are already pledged to the limit as security for their ·ent debts. The drought of 1919, followed by a hard winter a late, cold spring, caused high feed costs and other operating ·enses. There were severe sheep losses during the winter, a light ·b crop and heavy lamb losses during the spring. The wool clip ·s rather light and very little was sold—virtually none north of ·tral Arizona. Expectations of high prices for the lamb crop ·re not realized, in part at least, because of heavy and unexpected ·ports of frozen lamb and mutton[8] from Australasia and South ·erica. The severity of the blow resulting from failure to get ·ney for the wool shorn, which is normally counted on to pay ex-·ses of the previous winter and spring, was increased by the rinkage in the money receipts expected from the sale of lambs. ·e sheepmen have generally been unable to liquidate old indebted-·s for newer loans placed just before their wool money failed, as · receipts from lamb sales have gone largely to pay operating ex-nses up to December 1. The result of this condition is likely to be ·rious and far reaching.

Table 2 shows the decline in wool prices since the market broke ·n May, 1920. The data presented are for fairly comparable grades ·nd are as complete as can be procured at the present time. It is ·specially significant in that the decline in prices of Argentine wools ·s so closely paralleled by the percentage of decline for comparable ·merican grades. Many of the New Zealand and American figures ·re merely nominal quotations. The Argentine growers have cut prices freely to dispose of their surplus, and have forced down domestic prices at the same rate. The fact that the British Government, by far the largest owner of similar wools, has refused to meet the world price on medium and low wools, has held up the price of New Zealand and Australian crossbreds. The price of fine wools was so high last spring that a large percentage of decline was to be expected with the subsequent curtailment of mill demand.

TABLE 2.—*Decline in prices of wool, May to January, 1921—Scoured basis, seaboard markets, United States.*

On or about—	Three-eighths blood.		Quarter blood.		Low.	
	Argentine.[1]	New Zealand.[2]	Argentine.[3]	New Zealand.[4]	Argentine.[5]	New Zealand.[6]
	Cents.	*Cents.*	*Cents.*	*Cents.*	*Cents.*	*Cents.*
May 6	75-80	75-85	50-52	50-60	35-40	30-45
Aug. 26	45-50	70-75	30-35	35-45	25-30	20-35
Oct. 7	35-45	50-60	25-30	30-40	20-25	20-30
Nov. 4	28-30	45-50	20-22	30-40	16-18	20-30
Dec. 16	28-30	45-50	20-22	30-40	16-18	20-30
Jan. 6	28-30	45-50	20-22	30-40	16-18	20-30
Mar. 3	20-22	40-45	16-17	35-40	13-13½	17-23
Mar. 31	20-22	40-45	16-17	35-40	13-13½	17-23
Percentage of decline	73	47	68	32	66	38

[1] B. A. 3s. [2] N. Z. 50s. [3] B. A. 4s. [4] N. Z. 46s. [5] B. A. 5s. [6] N. Z. 36-40s.

[8] Up to Dec. 2 imports since April had amounted to 95,000,000 pounds, and about half of the total imports since April were stored for future disposal.

TABLE 2.—*Decline in prices of wool, May to January, 1921, etc.*—Continued.

On or about—	Fine.		Three-eighths blood, territory, United States.[9]	Quarter blood, territory, United States.[9]	Low, territory, United States.
	Australian.[7]	Territory, United States.[8]			
May 6	$2.20-$2.40	$2.00-$2.05	$1.15-$1.25	$1.00-$1.05	$0.50-$0.65
Aug. 26	1.65- 1.70	1.45- 1.55	.90- .95	.65- .70	.25- .30
Oct. 7	1.10- 1.20	1.25- 1.35	.70- .80	.50- .60	.18- .25
Nov. 4	1.10- 1.15	1.00- 1.10	.68- .73	.50- .55	.18- .22
Dec. 16	.85- .95	.80- .90	.52- .60	.40- .45	.15- .18
Jan. 6	.95- 1.00	.80- .87	.50- .55	.40- .45	.15- .18
Mar. 3	.95- 1.00	.85- .95	.55- .58	.45- .48	.15- .18
Mar. 31	.95- 1.00	.85- .95	.55- .58	.45- .48	.15- .18
Percentage of decline	58	56	53	55	71

[7] Aus. 64s. [8] Fine staple. [9] Combing.

WOOL CONTROL DURING THE WAR.

The importance of wool for military uses led to a large amount of governmental regulation of the industry during the war. Measures of control were taken by Great Britain soon after the beginning of hostilities. The requisition of goods for the army raised the question of the price to be paid for such goods. When the British Government set about ascertaining costs of production in the woolen industry it encountered difficulty owing to the continually rising price of the raw material, and this led to fixing the price of wool. Then the purchase of the home output of wool and the control of imports and exports led naturally to the purchase of the Australasian clip.

The British Government did not exercise control over the South African wool clip, but the sheep industry of that country was considerably affected by the Imperial control over the Australasian product. South America, also, which was the principal open wool market during the war, was affected both by the British and by the American regulations, and later by postwar developments in the wool trade. The steps taken by the American and the British Governments had a far-reaching influence on the wool situation throughout the world. The British wool control of the war period and the months following strongly influenced the accumulation of stocks of wool in the world at the close of hostilities. The control exercised by the United States Government had a close relation to British control and also was an appreciable factor in the accumulation of surplus stocks.

The entire output of frozen mutton and lamb available for export from Australasia was also taken over by the British Government. Inability to ship the frozen meats as fast as they were produced resulted in the accumulation of a large Australasian surplus, which now is affecting American meat prices through the shipment of a part of it to this country.

Some benefit has probably resulted from governmental control of wool in the dissemination of knowledge about grades and the preparation of wool for the market. For example, the Central Wool Committee, which administered the Imperial purchase in Australia, published a list of about 850 types and grades of wool—the most complete catalogue ever compiled. In South Africa the interest in

sheep and wool caused by high prices was followed by an attempt to improve the marketing methods. Purchase of the domestic clip by the United States Government was accompanied by a careful grading of it. In many cases the grower was furnished with a list of the grades he produced, the shrinkage, and the price. This was of considerable educational value.

THE WORLD WOOL CLIP.

The high price of wool during the war tended to increase the output, but other factors, such as the devastation in Europe, the high price of meats, and the Australian drought, prevented any permanent increase in the world's clip. In fact, the 1920 clip is somewhat below that of the years just preceding the war. The following tabulation shows in millions of pounds the comparative world production.[4]

TABLE 3.—*World production of wool.*

[In millions of pounds.]

	Prewar.	1920		Prewar.	1920
United Kingdom	120	100	Russia	380	200
United States	288	300	South Africa	156	172
Canada	11	15	Australia	570	528
Argentina	264	330	New Zealand	200	210
Uruguay	143	150	Other countries	400	360
Central Europe	70	30	Miscellaneous	50	60
Mediterranean Europe	90	70			
France	75	60	Total	2,817	2,585

THE TREND TOWARD CROSSBRED SHEEP.

Prior to the war there was a slow but steady gain in the production of crossbred wools relative to fine wools, resulting from increasing reliance on crossbred sheep instead of on Merinos in areas where mainly finewool sheep had formerly been kept. The change in Australia had been progressing slowly but steadily for many years, but it was accelerated by the demand for wools of medium and lower grades for military use. Slightly over one-third of the Australian clip is now composed of such wools. In New Zealand this movement had already progressed practically as far as it can go. In South Africa the country is best adapted to finewool sheep, and changes have been in the direction chiefly of improved Merino types. In Argentina, as other live stock and crop production has displaced sheep in the more favorable northern districts, virtually nothing but crossbreds have survived. They often have displaced Merinos in less favorable and more distant sections, and they have largely displaced the finewools in the southern Provinces save in areas where the environmnet has strongly favored Merinos. The same is true, though to a somewhat less extent, in Uruguay. In Europe, except in a few areas, finewool sheep have been of negligible importance for many years.

[4] As published in the Bulletin of the National Association of Wool Manufacturers and the London Times Trade Supplement, modified slightly for 1920 in the light of latest advices.

In the United States, outside of the Southwest and Texas, and scattered areas on the northern ranges, the tendency for a considerable period has been strongly toward crossbreeding, notwithstanding a pronounced preference for finewool bucks during recent years. The recent increased use of Merino (largely Rambouillet) rams was deemed necessary because of a too general loss of characteristics overlooked for a time, but desirable in range sheep and procurable only with a strong Merino foundation. The bulk of the sheep on northern ranges continues to be crossbreds, but with more Merino blood. In the farming States—east of the Rocky Mountains—Merinos have been almost completely eliminated from the flocks, except in the old finewool section of the upper Ohio Valley and a few other areas which are no longer of much importance. The Ohio area has been considerably restricted since 1910.

FUNDAMENTAL CHANGES IN THE INDUSTRY.

Fundamental changes, only slightly due to war conditions, have been taking place in all countries. The general, though not universal, trend has been an approach toward the apparent maximum sheep-carrying capacity of the land. This does not mean that many countries have not the territory for more sheep, but that, considered in relation to other industries, sheep raising is approaching a static condition.

The big estates in the older sections of Australia are steadily being broken up by taxation and land purchase laws. Many small clips have often taken the place of one large clip, and the result has frequently been a deterioration in the quality and preparation of the wool. Some expansion of the industry has taken place in the "outback" country, but that development has been slow because of poor transportation facilities. Future growth of sheep raising in Australia will be to a considerable extent in the form of smaller flocks, as a part of diversified farm or ranch operations. It is not expected that the flocks of Australia will again soon reach the number (106,421,068) recorded in 1891 in the Tariff Board's report published in 1912. The sheep industry also has probably nearly reached its maximum growth in New Zealand, and the rapid growth of dairying during late years will probably prevent further increase if it does not cause a decrease in number of sheep in the future.

Sheep raising is on the decline in the populous northern Provinces of Argentina, but there is still some room for expansion of the industry to the south and west. The check of immigration into the country during the war retarded the growth of agriculture somewhat and favored the sheep industry. The Uruguayan census of 1916 reported a decrease in the number of sheep in that country. The clip of all the other South American countries remains small, though there has been a large increase in extreme southern Chile, largely the result of an influx of shepherds from the Faulkland Islands. Much improvement has been made in the grade of wool grown in South Africa during the past few years. Purebred stock has been imported from Australia, and the Union Government has carried out educational measures which have resulted in better sheep husbandry.

Dairy herds have been increasing of late in Great Britain while the number of sheep has decreased. There was a considerable reduction in the flocks of continental Europe during the war, the losses being set at 7,500,000 by the American agricultural commission which visited the belligerent countries in 1918. Wool growing in Spain increased during the war; in the Scandinavian countries the industry has been losing ground. The number of sheep in Canada increased considerably during the war but in 1920 was only about as large as in 1871.

THE INDUSTRY IN THE UNITED STATES.

The wool clip of the United States has averaged about 300,000,000 pounds a year for the last 35 years. While the clip has varied only a little, the location of the industry in this country has shifted constantly westward, until now two-thirds of the wool is grown in the Rocky Mountain and Coast States. Ohio is the only State east of the Rocky Mountains which continues to be important in wool production. The northern range States, aside from areas where the character of the country is such that finewools must be kept, concentrate on crossbreds for market-lamb production, and some progress has been made toward the fixing of a dual purpose, crossbred type of sheep. In this region mutton and lamb are usually somewhat more important than wool in the flock receipts. Locally—as in the Idaho section—they are much more important than wool.

In Texas and a large part of New Mexico, finewools are kept largely for wool production, but in parts of New Mexico and most of Arizona good market lambs and desirable feeder lambs are bred from dams of Rambouillet type. Where feeder lambs are grown, wool usually is slightly more important than mutton in flock receipts, but when crossbred market lambs are produced the ratio is reversed. East of the Rockies lamb production from the Down breeds or their grades prevails virtually to the exclusion of finewools, and mutton and lamb sales are about twice as important as sales of wool. The only exception of moment is the Ohio region, where wool has been of somewhat greater importance in flock receipts than sheep and lambs. Sheep raising has never been of much importance in the South, except in the portions of Kentucky, Tennessee, and the Virginias, referred to in this report as the "early-lamb" region, where the production of early market lambs has been found profitable. Recent gains in number of sheep east of the Rocky Mountains were entirely the result of high prices for wool and other favorable factors, but these gains appear to have been lost as a result of the unprofitable season of 1920.

The Economic Justification of Delaine Sheep in Ohio.

The keeping of Delaine sheep in the Ohio region, with wool production as the chief aim of the shepherd, has been severely criticized in the past. There are parts of the Ohio region, however, where dairy farming is not practicable, and where the topography is such that beef cattle can not make maximum use of the large areas which must be kept in pasture to prevent destructive erosion. Resistance of Delaine sheep to parasite infection, their ability to grow heavy fleeces and

produce good lamb crops on pasture and roughage with much less grain than mutton breeds or crossbreds, and to produce more wool and in the long run as much or more mutton to the acre, have enabled the Delaines to hold their own against mutton breeds. The methods of flock management in this region are changing, however. Wethers are kept in much smaller numbers than formerly, and shepherds are depending more and more on lambs for their profits, particularly when they can fatten them for sale at about 1 year of age.

The Land Question in the Far West.

One of the chief problems confronting the range sheepmen prior to 1920 was the land question. Immigration and agricultural settlement have greatly restricted the area of public range and caused serious deterioration in carrying capacity, through overstocking. The creation and extension of national forests, later opened to sheep, have helped the industry, particularly by regulation and protection of the summer grazing areas. In order to stay in the business, however, sheepmen have had to make heavy investments in range land, particularly to protect their spring and fall range. Also where available winter range was lacking sheepmen have often been forced to make large purchases of farm land in order to raise winter feed. However, inability to protect owned or leased land, because of the necessity for leaving interspersed public lands open to all comers, has been a serious detriment to the industry, and continued settlement has caused overgrazing and management difficulties. Special bills providing for addition to various national forests of certain lands adjacent thereto, lands with some forests but no agricultural value, but necessary for the permanence of the industry, have helped solve the range problem in certain areas and doubtless will be of greater use in the future, although they will probably prove only a partial solution.

With the application of the stock-raising homestead act after the close of the war the land problem became acute. This was due to the rapid disappearance of spring range in critical areas. Sheepmen believe that in the long run the act will work to the benefit of the industry through sale of the homesteads to those stockmen able to survive, but it will be at the expense of many operators unable to stand the pressure, particularly of the smaller ones. This solution, moreover, will not affect large areas which are unsuitable for settlement and primarily fit only for winter range, but which are now entirely uncontrolled and often seriously damaged by overgrazing.

Organization and Financing.

Resulting to a considerable extent from the land question is the problem of organization and financing. With the range steadily curtailed, the total number of sheep run on it had to be cut down, often to below the most efficient size of outfit, which appears to be about 5,000 head. At the same time the size of the bands had to be considerably reduced, and usually more herders had to be used per band. Restriction of the range also necessitated expensive winter feeding in most areas north of the Southwest, and generally required expensive equipment in areas where it was possible to specialize in early lamb production. In the Southwest, where the land question

in general has often been less pressing, it was necessary to make expensive improvements in the form of wells and reservoirs. The steadily rising investment charges, operating expenses, and sheep values, although paralleled by rises in lamb and wool prices, have been by no means an unmixed blessing. The effect of heavy and unpreventable losses resulting from adverse seasons has been greatly accentuated, the climax having been reached in 1920.

Wool Marketing.

Owing to the wide range in grade, shrinkage, and character, the marketing of wool lacks the normally stabilizing influence of future trading, and being also subject to foreign competition, partakes of a decidedly speculative nature. Growers have lacked accurate information as to the market and the value of their clips, while they have been selling to buyers who are fully informed as to values, market conditions and probable trend, and the desirability of local and regional wools. For these reasons growers have been at a decided disadvantage when negotiating with buyers in the marketing of their product. Wool marketing, therefore, has been a contentious problem for many decades. Owing largely to inadequate knowledge, growers have usually sold their wools at range points (or contracted them before shearing) in the years when buyers were most anxious to secure the fiber and were competing strongly for it, but have had to ship it on consignment in the years when a declining market was most probable.

All persons in the wool trade, whatever their connection, agree that growers should sell their wools either at the shearing shed year after year, or consign it (year after year) in order to get the best price. During comparatively recent years relatively few of the sheepmen have been making consignments. On the whole they have not been willing to assume the risks of market fluctuations or the cost of carrying their wool until called for by the mills. Those who have sold on consignment have profited by the spread between prices at shearing shed and market center—a spread which explains why the dealers have remained in the business. In the fleece-wool States growers are handicapped by the small size of individual clips, frequently also by the very scattered nature of the production, and until very recent years few have sold cooperatively and to the best advantage. Shepherds of both range and fleece States have aimed in selling to make a quick turnover with a minimum of effort on their own part. Recent developments in the way of pooling county or State clips appear to have taught a valuable lesson to growers in the fleece States.

Sheep and Lamb Marketing.

The marketing of sheep and lambs, aside from the complication arising from competition with imported frozen carcasses during the past season, presents a problem which involves a reduction of the autumn glut as far as practicable, elimination or marked diminution of the flood of mediocre to cull lambs which reach the markets from the fleece States during the fall months, and if practicable a stimulation of consumption. The autumn glut can never be entirely removed, but it can be considerably relieved. Where local conditions make it practicable, sheepmen on the ranges can aid in this (1) by an

earlier marketing of lambs from areas where the producers now tend to overstay the market and ship a month or more later than really is necessary; (2) by an extension of winter lambing on farm land in parts of the Southwest and shipping the lambs during the period of lowest receipts; (3) by a more general adoption of shed lambing by northern sheepmen and earlier readiness for market; (4) by more complete use of local farm refuse to facilitate holding back at range points a larger percentage of thin lambs until the marketing crest has been passed; and (5) by shipment, so far as possible, of feeder lambs direct from range points to the feed yards—a practice which probably will increase in any case with the recent rise in freight rates. No one of these, with the possible exception of the last, can be carried very far or in itself accomplish a great deal, but in the aggregate they would accomplish an appreciable improvement. Shepherds of the farm States can help in reducing the fall glut (1) by the adoption of minor changes in flock management necessary to produce more lambs to be marketed before midsummer, and (2) by holding at farm points until December or January the lambs too thin for advantageous shipment earlier in the fall.

The holding up of lambs at farm points is inextricably bound up with elimination of the flood of mediocre and cull native lambs which depress the market each year from the latter part of August until about the middle of November. The docking of all lambs and the castration of the males, will undoubtedly improve their quality although it will not relieve the fall glut. Failure to follow this practice is a costly oversight and demands immediate correction. It is improbable that early or midsummer marketing of enough lambs will occur to cut down the normal midsummer price premium. A perceptible switch of autumn receipts to midsummer or earlier, and elimination of the market breaking flood of mediocre natives, will do much, however, to stabilize prices.

Cost of Production.

This report presents the results of cost of production studies in the range States, the Ohio region, and some cost figures for South Africa and Argentina. It must be noted that conditions under which the wool was grown were abnormal, especially in the United States, and the readjustment from war conditions has been pronounced during recent months. The data for the United States have a strong suggestive value with reference to the rise in costs since 1910, indicating the wide range in costs between different areas for different years. The Ohio data have a similar value when contrasted with range costs and profits and with estimated costs and profits under general farming conditions in the Middle West. The foreign costs are based on data too limited to be conclusive, but they illustrate general conditions. The facts ascertained indicate that the competitive positions of the main producing countries have remained practically unchanged during the past 10 years.

Tariff History.

There were various duties on wool and woolens in the tariff acts before 1861, but the modern system of duties really begins in 1867 at the time of the division of wool into three classes, "clothing,"

"combing," and "carpet wool." Provision was then made for levying different rates on the different classes, and for doubling the duty on washed wool of Class I and for trebling it on scoured wool of all three classes. The rates which were imposed in 1867 were kept in force until 1883, with the exception of a short period under the act of 1872, when they were reduced by 10 per cent. In 1883 the duty was reduced slightly, and the compensatory duty on manufactures was rearranged on the assumption that only 3½ pounds of wool were used in making a pound of cloth, instead of 4 pounds as under the act of 1867. In 1890 the rates were restored to what was practically the scale of 1867, although in this year the duties on carpet wools were made ad valorem and the trebled duty on scoured wool of that class was dropped. Some alterations were made in succeeding tariff acts, but with the exception of the period of free wool from 1894 to 1897, the rates of 1890, which were substantially those adopted in 1867, remained in force until 1913. There has been a great deal of controversy over the actual effect of the duties, and also over the results of their removal in 1894.

The Compensatory System.

The adjustment of the compensatory duties has been one of the controversial points. Another important question has been the comparative effects of the duties on the different branches of wool manufacture. A duty levied on the grease pound has naturally discriminated in favor of the light-shrinking wools. To the extent that the worsted manufacturer used more of these wools than the woolen manufacturer he was given a competitive advantage. Ad valorem duties have been discussed at various times, being favored by some as eliminating the discrimination which has just been mentioned, and being opposed by others on the ground that no adequate system of compensatory duties could be framed with an ad valorem duty on raw wool as its basis. Whether the imported carpet wools came into competition with domestic products, and if so, to what extent, has been another moot question. The history of these controversies is given in this report.

The Tariff Board in 1911 came to a definite conclusion on some of these points. It showed in a report on Schedule K that the "4 to 1" ratio of compensation was more than adequate, and that some additional protection was thereby granted to wool manufacturers. The Board also pointed out that there was no longer any good reason for distinguishing between Class I and Class II wools, because improvements in combing machinery now make it possible to use much shorter staple wools than formerly in the manufacture of worsteds. It favored levying the wool duty on the basis of the scoured content, and maintained that this would be superior to any ad valorem method or to any method of specific duties levied on grease wool at rates varying with the estimated shrinkage. The Board also reached the conclusion that imported carpet wools were competitive with domestic wools only to a very limited degree.

The Tariff Board after an extensive investigation found that the average shrinkage of imported wool was less than 66⅔ per cent in scouring, this shrinkage being the basis on which the treble duty was assessed on scoured wools. The average shrinkage of wools im-

ported from Australia and South America was about 48 per cent, while the average for domestic wools was between 55 and 60 per cent.

The Tariff Commission does not take issue with the Tariff Board on any of these findings, but rather in the light of its own investigations reaffirms the wisdom of all of them.

Classification and Basis for Duty.

The distinction between Class I and Class II wools seems particularly unnecessary. The amount of wool of Class II now imported is comparatively small. Improvements in machinery are constantly bringing about a greater interchangeability in the use of different kinds of wool and the case seems clear for doing away with the distinction. Furthermore, no matter which branch of the industry is more adversely affected by discrimination against the heavy shrinking wools, conditions will be equalized by imposition of the duty upon the scoured content. This would do away not only with discrimination between heavy-shrinking and light-shrinking wools, but also with the discrimination against scoured wool which resulted from the triple duty on it. This has been cited as discrimination against the woolen branch of the manufacturing industry, which bought more wool in the scoured condition than did the worsted branch.

The Tariff Board objected to an ad valorem duty, not only because of the difficulty of administering it, but also because when prices increase and protection is less needed, the ad valorem duty rises, while a specific duty when prices are high becomes in effect a lower duty. When prices fall the converse of this proposition applies. In this way the ad valorem duty on wool gives the domestic woolgrower less protection when he needs more, and vice versa. Some manufacturers have, however, opposed this reasoning on the ground that the situation is entirely to the woolgrower's interest, while from the manufacturer's point of view, an ad valorem duty would tend to equalize conditions for them in competition with foreign manufacturers. Inasmuch as their criticism is directed against the duty on wool, their reasoning seems illogical, as the compensatory duty is intended solely to offset their higher costs for raw material. A duty on the scoured content of imported wools could only raise domestic wool prices by the amount of the duty, and a proper compensatory levy on importations of manufactures of wool is all that is necessary to offset this, irrespective of the rise or fall of world prices for wool.

To make a specific duty on the scoured content absolutely fair, cognizance should be taken of the different values of wool. One rate on all wool suitable for making wearing apparel, and another rate on what were formerly Class III wools would do much toward this result. However, within the limits of each class there would still be variations in value. If it were desired to take cognizance of this, instead of assessing different rates according to the declared value of the wool, it would be better to establish certain standards for fine, medium, and coarse wools, with a different specific duty for each on the scoured basis.

Although it would be possible to establish equivalents for many grades, it would be very difficult to make a classification which would cover all possible cases, because of the almost infinite variations in

wool fiber. The dividing lines, however, between coarse and medium, and between medium and fine are so clear that not much difficulty would be experienced in establishing them.[5] Some inequality in such a system would arise from the fact that wool just above the dividing line between classes would be discriminated against as compared with wool just below it. Thus, under the former law, carpet wool worth 12½ cents on which the duty was 7 cents a pound was discriminated against, as compared with carpet wool worth 11½ cents on which the duty was only 4 cents a pound. In practice such discrimination would be of small moment. That a large number of grades would not be necessary is shown by the fact that the domestic price per scoured pound from 1909–1915 did not differ widely for different grades, rarely indeed over 15 per cent. This was not greatly changed during the recent years of high prices until 1919, when finewools were in much greater demand than wool of lower grades. The surplus world supply of the lower grades then widened considerably the spread in price. The rather wide difference now existing can be only temporary, though the spread between fine and lower grades may remain wider for a few years than it was prior to 1916. It hardly seems expedient that a simple, easily collected, specific duty per scoured pound should be complicated by variations in rate on numerous commercial grades. It would not be feasible to classify carpet wool according to spinning counts, and the adoption of a single specific rate on a scoured basis would cause less inequality than the reestablishment of different rates on different "value-classes" such as obtained under the law of 1909. Aside from classification, if a duty is levied on wool it should be on the basis of the scoured content.

[5] The Bureau of Markets has already established tentative standards.

THE WOOL-GROWING INDUSTRY.

PART I.

CHAPTER 1.

INTRODUCTION.

There exists a great mass of material of a technical nature, bearing on the many varieties of wool and on the details of sheep husbandry. Much of this is interesting to one engaged in the wool trade or in sheep husbandry, but irrelevant so far as the tariff is concerned. An effort has been made to eliminate from this report the discussion of all technical details, an understanding of which is not necessary to a consideration of the tariff. The function of the Commission to furnish full information on the industry has not been narrowly interpreted, however, since an understanding of many details is necessary to a comprehension of the situation.

The principal objects to be attained by a comprehensive treatment of the wool-growing industry are the simplification and orderly presentation of the available information, and the study of recent changes in the industry which, like most forms of economic activity, has been influenced by the war. Many changes not due to the war have also taken place in the sheep industry during the past few years.

This report has been prepared only after examination of a great many sources of information. Field work, correspondence, public hearings, conferences with many authorities on various phases of the industry and with those concerned with sheep husbandry, and the cooperation of experts in foreign countries have made possible this survey of conditions in the wool-growing industry throughout the world.

FUNDAMENTAL FACTS CONCERNING THE INDUSTRY.

There are certain facts which are necessary to an understanding of the subject. These relate either to technical matters or to the broad industrial aspects of the sheep industry. At the risk of repeating facts known to many readers, they are considered at this point because of their fundamental character.

Wool is unique, being distinct from hair and from all vegetable fibers. Its peculiar characteristics are the serrations and elasticity

which make possible the spinning of the fiber into cloth that absorbs moisture and is comparatively impervious to cold. The possession of these qualities has rendered it superior, for many purposes, to all other fabrics, and no good substitute for it has ever been found.

The four leading classes of sheep are: The Merino, which originated in Spain, a small sheep with a heavy, greasy fleece of fine wool; the various breeds of English sheep, which are larger bodied than the Merino and have longer and coarser wool; the crossbreds (crosses between Merino and English sheep); the "native," unimproved breeds of many countries, which produce grades of wool inferior for making clothing. There are many varieties under each class. The Rambouillet, for example, is a type of Merino which was developed in France from a parent stock coming originally from Spain. The two main subdivisions of English sheep are the "long wools" and the "downs," and of these there are many varieties under each subdivision. Among the various crossbreds the Lincoln-Merino crosses and the Cotswold-Merino crosses are favorites. The types of "native" sheep are many and various.

Sheep raising is carried on by various methods, the principal kinds being (1) the range system, which is adapted to frontier regions or other places where there are great areas of unoccupied land on which large flocks of sheep can graze; (2) the paddock system, in which sheep are run under substantially natural conditions, but within fence; and (3) under farm conditions. There are various intermediate kinds of sheep raising, but the industry may be divided, in a broad way, into these three different types.

Wool was a far more important product than mutton in the earlier days of this country, and the same was true of Australia, South Africa, and South America in the earlier period of the industry. Practically the entire returns to the producer came from the sale of wool. At the present time, in those countries where sheep raising is carried on under the range system or the paddock system, wool is usually (although not always, by any means) the principal product.[1] Under farm conditions, on the other hand, the statement that mutton is the principal product holds good in a broad, general way, although exceptions to this statement may also be taken in some instances.

Where sheep raising is carried on under range or paddock conditions, the Merino or Merino crossbreds are the favored breeds. The Merino has a dense and fine fleece, is very hardy, and has excellent herding (or flocking) qualities. Merino crossbreds have the same characteristics, though to a less degree. England is the home

[1] It should be understood, however, that it is not the system which determines the product. That is the result of complex factors. In New Zealand the paddock system is the one most in use, and mutton and wool are about equally important.

of the so-called "mutton" breeds of sheep, and experts have developed desirable breed characteristics to a remarkable degree. At least one strain of crossbred sheep has been developed to the point where the type is perpetuated from one generation to another,[2] but as a rule crossbreeding quickly results in unevenness of type and necessitates continued use of pure blood to restore the desired combination of breed characteristics. Under farm conditions, the English breeds are in favor because they are larger, afford better mutton carcasses, and the lambs mature early. As the flocks are kept in inclosures, lack of herding quality is of no consequence. Merinos, and to a less extent the crossbreds, are well adapted to a dry climate. Mutton breeds were perfected in and are better adapted to a humid climate. The ranges are usually found in dry sections, where the sparse vegetation makes general agriculture unprofitable, while farms are found in the well-watered or irrigated areas.[3] Sheep, especially those with a pronounced Merino heredity, thrive on surprisingly barren land. They live on more sparse vegetation than will cattle. Goats are the only live stock which subsist on land more barren than that on which sheep can live.

The leading sheep-raising countries are Australia, New Zealand, Argentina, Uruguay, South Africa, Russia, China, Great Britain, and the United States. The leading wool-manufacturing countries are the United States, England, France, Germany, and Belgium. It will thus be seen that the United States and Great Britain are the only countries which both grow and manufacture wool on a large scale.[4] The principal difference between these countries, aside from the fact that the United States has produced a much larger proportion of the wool required at home for the consumption of mills, is the fact that in the United States the industry is conducted both on the farm and the range basis,[5] while in England it is conducted primarily on farms. The western half of the United States maintains flocks of crossbreds with strong Merino characteristics and the eastern half (with the exception of the Upper Ohio Valley) has grade flocks and some pure breeds of the mutton varieties. England has comparatively small flocks of mutton breeds.

The taste of the English public for mutton has been a great factor in encouraging the maintenance of flocks of mutton sheep. Compared with the English, the American demand for lamb and mutton has been very small, but of late years the public of this country has been developing an appreciation of this kind of meat, and the con-

[2] The Corriedale, which has been developed in New Zealand.

[3] For consideration of dry farming, see Chap. 8, infra.

[4] Great Britain produces less than one-half as much wool as the United States, and no European country except Russia grows one-half as much wool as Great Britain.

[5] Approximately one-third of the wool clip of the United States comes from farms.

sumption of it seems likely to increase at an even more rapid rate than in the past.

The British Empire has produced much the greater part of the world's exportable surplus of wool suitable for making clothing. Low-grade wools have been produced in China, India, Russia, Siberia, Turkey, the Balkan States, and various other parts of the world. Most of the wool from these sources is not suitable for making clothing, but is classed as "carpet wool."

Some wool is marketed in the state in which it comes from the sheep's back, while some is washed to eliminate a part of the impurities. Wool which has had all foreign matter removed is called "scoured." The decrease in weight between the wool in the natural state and in the "scoured" state is its "shrinkage." This varies greatly between wools of different kinds. Merino usually has a heavier shrinkage than crossbred, and crossbred than English wool. The difference between wool in these various stages has been recognized in making tariff rates in the past.[6]

The two great branches of wool manufacturing are the woolen and the worsted industries. The former originally used the shorter and finer wool which had to be carded, while the latter used the wools of longer staple which could be combed.[7] Through the improvement in combing machinery, short wools (though not the shortest) can now be combed and there is a great range of interchangeability between combing and carding wools. Through the growth of the worsted industry, it has come to use a greater quantity of fine wool than the woolen industry.

There has been some competition between cotton and wool and between wool and "reclaimed wool" (or shoddy), but, in spite of this, during the years before the war, the outstanding fact in regard to the world situation was that the demand for wool was increasing, while the supply was about stationary. The highest prices ever paid for wool were given during and after the war. The crossbred wools were in great demand for the manufacture of khaki and for a short time the prices of crossbred were higher than the prices for Merino, but the tendency after the armistice was toward the use of the finer fabrics, and, with the stationary production of fine Merino wools this meant very high prices for high-grade wools of that variety. There was available some of the fine wool accumulated in Australia. Nevertheless, the price rose and remained at a high point for over a year after the London auctions were resumed.[8]

Different systems of grading are used in this country and abroad. The "blood classification" has been used here, i. e., wool has been

[6] See Chap. 17, infra.
[7] For further discussion of the uses of various kinds of wool, see Chap. 18, infra.
[8] In April, 1919.

called "quarter blood," "half blood," etc. This originally referred to the proportion of Merino blood in the sheep from which the wool was shorn, but at present it has no such significance. "Quarter blood" may be wool having no trace of Merino, but simply wool showing much the same characteristics as to length and fineness as that formerly found in the wool of sheep of one-fourth Merino blood. In England and Australia wool has been designated as 36s, 40s, etc., according to the "count" or size of yarn to which the wool would spin.[9] It is often sold, however, under trade names which have no relation to this "count" system.

Before the war England led in the exportation of woolen yarns and cloth. The European countries, especially Germany and Belgium, used large amounts of low-grade, burry, and seedy wools, eliminating the waste by the process of carbonizing. The export trade of Germany had grown greatly, but was, of course, lost during the war period, while the development of an export business was one of the leading features of the American woolen industry between 1914 and 1919.

WOOL QUESTION ONE OF THE LEADING TARIFF ISSUES OF THE PAST.

The opposing views as to the desirability of a duty on wool may be stated briefly as follows:

The advocates of protection have maintained that it is necessary to offset, by means of a duty, the increasing disadvantage of this country in wool growing. They have held that the growing of wool is a necessary part of diversified national economy, and that. if other industries are to be encouraged by duties, there is no reason why wool should not receive its share of protection. They believe that, although the production of wool has not increased in this country for the past 30 years or more, the duty on wool has been effective because without protection, production would have decreased. They state that the price of wool is so small a part of the value of clothing that any increase in the price of clothing due to a duty on wool is negligible.

The opponents of a duty on wool argue that wool-growing on a large scale is an industry best suited to frontier conditions; that as the country becomes more and more thickly settled the range conditions must give way to farm conditions, and as the profit of sheep raising under the latter form of agriculture usually depends more on the meat than on the wool, it is not feasible to try to maintain the industry by a wool duty. They assert that the prosperity of the wool-growing industry has been governed by conditions ruling in the world market regardless of any duty on wool which has ex-

[9] For full discussion of this subject, see Chap. 18, infra.

isted, and that decreases in the number of sheep which have occurred during periods of free wool would have occurred irrespective of tariff changes. They say also that because articles made from wool are objects of general use the wool should be secured at the very lowest possible cost from whatever source obtainable. They deny, moreover, the statement that the price of wool does not affect the price of clothing.

There are many side issues which have been discussed at great length, but the above outline covers the general arguments which have been advanced on the opposing sides. The attention which the problem has received in the past justifies extended consideration at this time, in order that the tendency of recent developments may be duly weighed. We have just passed through a period which has brought about fundamental readjustments in many lines of industry, and it is conceivable that some of these changes may have far-reaching effects on sheep raising and wool growing.

There are many reasons why the question of the wool duties has been one of the leading issues in tariff discussions of the past. One of the principal causes is the fact that it involves an adjustment between two industries of very different nature. When a duty on wool is levied, the difficult question of the determination of fair compensatory duties on the manufactured products necessarily commands attention.

The value of the domestic wool clip in 1919 was about $150,000,000. The value of sheep and lambs marketed for slaughter was probably considerably more than that, and the value of breeding stock sold annually is large. The ownership of sheep is widely distributed, and the total investment in sheep alone (not including land or improvements) is not far from half a billion dollars.

The woolen and worsted manufacturing industry ranked seventeenth, in value of products, among the industries of this country in 1914. It stood second among the textile industries, cotton manufacturing ranking first, and silk manufacturing third; among the 16 industries which ranked ahead of it were several which should be classified rather as groups of industries than as single industries, as for example, "Foundry and machine-shop products" and "Cars and general shop construction."

About two-fifths of the wool used before the war by the wool-manufacturing industry was imported. In 1918 and 1919 about three-fifths was imported. The only imports of raw materials which exceeded in value the imports of wool in 1914 and 1915 were hides and skins, india rubber, and raw silk. In 1916 the imports of wool were exceeded in value only by the imports of hides and skins and india rubber, and in 1918 only by the latter. Two of these products

do not compete with any domestic product, while hides and skins, though somewhat competitive, are of less importance to the cattle raiser than wool is to the sheepman.

THE TARIFF BOARD REPORT ON SCHEDULE K.

The Tariff Board appointed by President Taft published, in 1912, a report on wool,[10] which was the most exhaustive study of the subject ever made up to that time. That report dealt with manufactures of wool, as well as with raw wool, and consequently, had a wider scope than this report. The greater part of it, in fact, related to manufactures. One of the features of the document which attracted the most attention was its conclusion as to comparative costs of production at home and abroad. Before reviewing its findings under that head, it will be well to give at least a partial résumé of the large amount of information on the wool-growing industry which was contained in it. Its study of the industry up to the date of its publication was so thorough that the Tariff Commission has concentrated its attention on developments since 1910.

The report on Schedule K begins with an analysis, by paragraphs, of the wool schedule of the tariff act of August 5, 1909, and a statistical survey of the industries affected. The basis of the tariff on wool and manufactures thereof was to be found in the act of March 2, 1867, the object of which was to furnish adequate protection for both the wool growers and the wool manufacturers, whose interests in the importation of foreign wools were said to be opposed. Schedule K remained substantially the same in principle from that time until the revision of October 3, 1913, with the exception of the period 1894–1897. The "compensatory" system was adopted on the assumption that it takes four pounds of raw or "grease" wool to make one pound of finished cloth.[11] It was recognized that the ratio would not be true for much of the wool imported, but would be more than compensatory in many cases. The argument used in favor of its adoption was, however, that it was necessary to adopt the "four to one" ratio in order to make the heavy-shrinking wools available for the American manufacturers. Schedule K was, therefore, framed on the assumption that the average shrinkage of wool in scouring is 66⅔ per cent, the rest of the allowance being for shrinkage from scoured wool to cloth.

In the tariff act of 1867, wool was divided into "Class I, Clothing wool," wool having any trace of Merino blood; "Class II, Combing wool," wool from the English breeds of sheep; and "Class III, Carpet wool," low-grade wool from unimproved or "native" breeds of sheep. In the revision of 1890 the designations "clothing,"

[10] Report of the Tariff Board on Schedule K (1911). 62d Cong., 2d sess., H. Doc. No. 342.
[11] This ratio was first used, in legislation relating to wool manufactures, in 1861.

"combing," and "carpet" were dropped, in view of the changing uses of the wools, but the "blood" classification was retained.

According to the act of 1909, 11 cents a pound was levied on wool of Class I—"in the grease." Double this amount was collected if the wool were washed, and triple duty was levied if it were scoured. Twelve cents a pound was levied on Class II wool, no double duty in case of washed, but triple duty in case of scoured wool. Four cents a pound was levied on Class III wool, valued at 12 cents or less per pound, and 7 cents a pound on wool of Class III, valued at more than 12 cents per pound. No double duty was levied on Class III washed wool, but a triple duty was levied on the scoured wool.

The elimination of the double duty on washed wool of Class II came about in 1867 as a concession to the worsted manufacture, which was then an infant industry. The worsted industry now uses (and used in 1911, as the "Report on Schedule K" states) more Class I than Class II wools, and also uses more Class I wools than the carded woolen industry. Fashion apparently had much to do with the great growth of the worsted industry.

The triple duty on the scoured wool was a discrimination between branches of the industry, in so far as one used more scoured wool than the other. The report states that "some of the small woolen mills, making the lower grades of goods, purchase in the scoured condition such wool as they use for blending with wool substitutes."

In regard to the use of cotton by the wool-manufacturing industry, the largest increase from 1890 to 1910 was in the hosiery and knit goods branch, while the amount used in woolen goods declined, and that used in worsteds increased much less rapidly than the quantity of raw wool used.[12]

The report describes the various kinds of wool, points out the principal localities of production, and gives a statistical survey of the sheep industry in the leading wool-growing countries. It shows that the United States had been producing, up to 1911, about 300,000,000 pounds of wool a year, consisting principally of the "fine" and "medium" grades. The so-called "carpet" wools and the "luster" wools comprised a small percentage of the domestic clip. The usual annual requirements of our manufacturers were about 500,000,000 pounds of wool in the grease. The home-grown wool provided for about 65 per cent of the needs of the mills of the United States. The leading foreign sources of supply were Australia, New Zealand, Argentina, and Uruguay. The report, therefore, first compared the general conditions surrounding production in the United States with those prevailing in the Southern Hemisphere. This gen-

[12] Cotton, cotton yarn, and shoddy were relatively of less importance as compared with new wool in producing woolen and worsted clothing in 1909 than in 1889 or 1899.—Report of the Tariff Board on Schedule K (1911), p. 97.

eral survey was followed by a detailed analysis of costs of production at home and abroad, and the whole was supplemented by special reports which described in great detail the conditions prevailing in different localities, both in this and in foreign countries.

Most attention was naturally paid to the regions which produce wool competitive with home-grown wool. The conclusion was drawn by the Board that some of the fine wools of Montana, Wyoming, Idaho, and Oregon compete directly with fine Australian 64s–70s wools; that the Delaine wools of the "Ohio region" (said to be the strongest wools of Merino blood raised in the world) meet with competition from the Merino combing wools of Australia, while "Michigan fine combing" meets the Sydney and Adelaide 64s. They concluded that there was practically no wool grown in this country which equaled Australian 80s, or finer.

The situation of the industry in the United States was very different in 1911 from that of wool growing in Australasia and South America, our chief competitors. The "paddock" and "range" systems were distinctly the leading types of organization of the industry in those countries, and there was considerable room to expand. A greater number of sheep were kept under the range system than on the "farm" plan in the United States, but in this country, as the Board says, "at the present time practically every acre of grazing land in the West is in use and somewhat overstocked, resulting in occasional heavy losses."[13] The Board came to the following conclusions regarding the costs of production in this and foreign countries: That, in the western part of the United States—the "range" section—where about two-thirds of the sheep were to be found, the "fine" and "fine medium" wools "cost," on the average, 11 cents per pound. "Cost" was figured on the following basis: All receipts from sources other than wool were set off against total expenses for the flock, and the balance was considered the cost of the wool obtained. The proportion of receipts from wool and mutton, respectively, varied over a wide range. The average for the whole country was 57 per cent from mutton and 43 per cent from wool. The report states:[14] "It will be noted that, in general, the higher this percentage is [of receipts from wool] the higher is the average net charge against a pound of wool and the lower is the average net income on capital." The item of interest on investment was eliminated in comparing domestic and foreign costs and the actual pro-

[13] Most of the large, free ranges of the early days of western sheep raising have been broken up by the coming of the homesteader, and in order to utilize the free range remaining the flock owner must run his sheep in comparatively small bands. Furthermore, the land policy of the United States has been unfavorable to the holding of large tracts of land, and therefore grazing land belonging to flock owners, or leased by them from the State or from private parties, often consists of scattered sections.—Report of the Tariff Board on Schedule K (1911), p. 340.

[14] P. 329.

duction cost of harvested crops fed to flocks was used instead of their market value.[15]

The "cost" (i. e., the net charges against wool), figured on the same basis, for the "Ohio region," was 19 cents a pound, wool being produced in that section at a higher cost than anywhere else in the world. In the States east of the Missouri River (with the exception of the upper Ohio Valley region), where wool production was incidental to general farming and small farm flocks were the rule, the receipts from the sale of sheep and lambs ordinarily covered the flock expense, leaving the wool for profit.

The Board fixed the average charge against the entire clip of the country, both fine and coarse wools, at about 9½ cents a pound, the corresponding charge in South America at between 4 and 5 cents a pound, and that in Australia and New Zealand as almost negligible; that is, receipts from other sources than wool were carrying the flock expense in Australasia.[16]

It is evident that, according to this method, the cost of wool depended directly on the receipts from mutton, decreasing as the latter increased, and vice versa. The defects of this manner of computing cost were readily admitted, but it was maintained that it was the most feasible course to pursue for tariff purposes.[17]

The conclusion of the Board was, therefore, that the difference between the "average cost of production" of wool at home and in Australasia was about equal to the effective amount of protection to raw wool under Schedule K, while the difference between the costs in this country and in South America was less than the effective protection.[18]

The Board also came to the conclusion that the part of the duty, in the act of 1909, on manufactured goods, which was supposed to compensate the maker for his increased cost of raw material, was in reality, in many cases, more than compensatory.

A careful investigation was made in regard to the shrinkage of wool. The rates in Schedule K were, as stated above, based on the assumption that wool shrinks on the average about 66⅔ per cent in scouring. It was found that the average was not so great as that.

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[15] These matters are discussed in Chap. 10, infra.

[16] Report of the Tariff Board on Schedule K (1911), p. 344.

[17] The conclusion is inevitable that when the woolgrowers' receipts are derived partly from wool and partly from mutton, it is impossible to apportion the costs between the two products, and that therefore we can not obtain a result which can accurately be termed the cost of producing a pound of wool. However, this need occasion no concern, since the bearing of the receipts from wool on the returns from flock husbandry, as carried on in the region under consideration, can be ascertained and the object of this investigation can thus be accomplished.—Report of the Tariff Board on Schedule K (1911), pp. 312–313.

[18] The effective protection was considered to be two or three cents less than the nominal amount, on account of the "skirting" of Australian wool, i. e., the practice of eliminating the poorer parts around the edges of the fleece.

The average shrinkage of wools imported up to 1910 from Australia and South America was about 48 per cent, while the average for domestic wools was between 55 and 60 per cent.[29]

The Board declared defective the method of levying a specific duty on wool in the grease, because on account of the varying shrinkages, it operated to prevent the importation of some of the higher grade wools. It held the specific duty to be superior to the ad valorem, however, and favored levying a specific duty based on the scoured content of the wool. It also held that there was no longer any good reason for distinguishing between Class I and Class II wools.

SCOPE OF THIS REPORT.

When the Tariff Board made its report the tendency throughout the world was toward the keeping of more crossbred sheep.[30] Many authorities have concluded that it is to this class of sheep, kept on other than a strictly "range" basis, that we must look for an increase in the world's supply of wool. This is one of the leading problems of the industry, and is given considerable attention in this report.

The subject of wool is one which has a great many ramifications. It touches international policy in regard to the control of raw materials. It involves domestic policy with respect to the use of our natural resources, control of public lands, relations between producers, middlemen, and consumers, and development of cooperative methods. It is related to many agricultural questions—use of the soil, management of live stock, choice of crops and other farm and ranch-management problems. It also has a vital relation to the consumers' interests, because of the common use of the products made from wool.

Because of this diversity in the lines of thought which are suggested it has been somewhat difficult to make of the report a unified whole. This is, however, the object which the Commission has had steadfastly in view. The greater part of the report is, of necessity, the development of facts necessary to a complete grasp of the direct tariff problem, which has been considered in the later chapters. Part I of the report consists of an introduction, and survey, chiefly statistical, of the world production and consumption of wool and a discussion of wool control during the war period, 1914–1918, and the general effect of Government regulation of the industry upon post-war

[29] The average shrinkage of fine western wools was found to be 67 per cent. The average for all wools from that region was 62 per cent. Of Ohio and other fine domestic fleeces, 60 per cent; of the lower grade domestic sorts, about 45 per cent; of imported South American crossbred wools, 33 per cent; and of imported Australian crossbreds, 30 per cent; of Class II (English washed) wools, from 18 to 30 per cent.—Report of the Tariff Board on Schedule K (1911), p. 331.

[30] Report of the Tariff Board on Schedule K (1911), p. 394.

conditions. In Part II the Commission has taken up a detailed consideration of wool growing in the United States. There is a discussion of the wool-growing industry and its problems in both the farm states of the East and the range states of the far West. Particularly, questions such as the relation of our public-land policy to the sheep industry, the organization and financing of wool growing, the cost of production of wool and mutton in the range states, and the problems of the marketing of both wool and sheep, have been discussed at length. Part III is a discussion of wool growing in the important competing areas outside the United States. These include Australia, New Zealand, British South Africa, and Argentina. These chapters provide data for comparison with the wool-growing industry in the United States. In Part IV the Commission surveys the history of the wool tariff in the United States and presents certain suggestions and recommendations upon classification of wools and the basis upon which an import duty should be levied, in case Congress decides to impose a duty upon raw wools.

Chapter 2.

SURVEY OF THE WORLD PRODUCTION AND CONSUMPTION OF WOOL.

PRODUCTION OF WOOL SUITABLE FOR MAKING CLOTHING.

Most of the leading sources of the present supply of wool are in the Southern Hemisphere. The character of the wool clips of the various regions may be described briefly as follows: Australia is the great source of supply of Merino wool. Of late years an increasing amount of crossbred wool has been grown there, but the country is chiefly famous for its clips of rather fine Merino of moderate shrinkage. New Zealand, on the other hand, grows crossbred wool almost exclusively. South Africa furnishes Merino wool, most of which does not seriously challenge the superiority of Australian fine Merino. Argentina is predominantly a crossbred wool country, and Uruguay is becoming so, although in the past it has produced considerable Merino wool. In Great Britain, where mutton is much more important to the flockmasters than wool, the "luster" and "down" wools are the kinds produced. Continental Europe raises more crossbred and "down" wool than Merino, and the same is true of Canada. In the United States various kinds of wool are raised under the different conditions existing in the different parts of the country. In the far West the proportion of Merino blood is usually large, while in the "farm States," except in the upper Ohio Valley, the common types are crosses of various English breeds, having little or no Merino blood. The low-grade wools shorn from "native" or "unimproved" sheep, and used chiefly for carpets, and to some extent for mixing with the better wools in making blankets and rough cloth, come principally from China, India, Russia, the Near East, and the Balkans, though additional supplies come from almost every part of the world. This gives, in a general way, a view of the kinds of wool raised in the countries which furnish by far the greater part of the world's supply. Before analyzing more carefully the world's wool output, the following figures, which illustrate the important position of the British Empire in the industry, are given:[1]

[1] Report of the Departmental Committee appointed by the Board of Trade to consider the position of the Textile Trades after the war. British Blue Book, 1918, Cd. 9070, p. 27. The figures of the Committee have been slightly amended here.

TABLE I.—*World's Production of Wool, 1915.*
(000 omitted.)

Country.	Total production.	Merino.	Crossbred.	Carpet, etc.
BRITISH EMPIRE.	*Pounds.*	*Pounds.*	*Pounds.*	*Pounds.*
United Kingdom	122,000	.....	[a] 122,000	.....
Australia	570,000	484,500	85,000	.....
New Zealand	197,000	6,000	191,000	.....
Cape	180,000	180,000	.....	.....
Falkland Islands	4,000	.....	4,000	.....
Canada	11,000	.....	[b] 11,000	.....
British India	60,000	.....	.....	60,000
Total	1,144,000	670,500	413,500	60,000
PRINCIPAL EUROPEAN COUNTRIES.				
France	79,000	15,800	63,200	.....
Russia	380,000	76,000	.....	304,000
Italy	21,000	15,750	5,250	.....
Spain and Portugal	62,000	31,000	31,000	.....
Germany	25,000	5,000	20,000	.....
Austria-Hungary	42,000	8,000	34,000	.....
Total	609,000	151,550	153,450	304,000
United States	304,000	174,000	130,000	.....
South America	404,000	73,000	331,000	.....
Other countries	338,000	.....	.....	338,000
Total	1,046,000	247,000	461,000	338,000
Grand total	2,799,000	1,069,050	1,027,950	702,000

[a] English long and down wools. [b] Crossbred and English wools.

TABLE II.—*World's Production of Wool, 1919.*[a]
(000 omitted.)

Country.	Total production.	Merino.	Crossbred and English.	Carpet etc.
BRITISH EMPIRE.	*Pounds.*	*Pounds.*	*Pounds.*	*Pounds.*
Australia	653,000	457,000	196,000	.....
British India	60,000	.....	.....	60,000
Canada	15,000	.....	[b] 15,000	.....
Falkland Islands	3,000	.....	3,000	.....
New Zealand	228,000	9,000	219,000	.....
South Africa	100,000	97,000	.....	3,000
United Kingdom	118,000	.....	[c] 118,000	.....
Total	1,177,000	563,000	551,000	63,000
PRINCIPAL EUROPEAN COUNTRIES.				
Austria-Hungary	42,000	8,000	34,000	.....
France	50,000	10,000	40,000	.....
Germany	26,000	5,000	21,000	.....
Greece	16,000	.....	.....	16,000
Italy	35,000	26,000	9,000	.....
Portugal	7,000	3,000	3,000	1,000
Russia	320,000	20,000	.....	300,000
Spain	52,000	25,000	25,000	2,000
Turkey and the Balkan States	91,000	.....	.....	91,000
Total	639,000	97,000	132,000	410,000
South America	480,000	80,000	360,000	40,000
United States	314,000	157,000	157,000	.....
Other countries	281,000	.....	.....	281,000
Total	1,075,000	237,000	517,000	321,000
Grand total	2,891,000	897,000	1,200,000	794,000

[a] This table is constructed mainly on the basis of wool figures from the Bulletin of the National Association of Wool Manufacturers for January, 1920, p. 111. The figures for Australasia are from Daigety's Annual Wool Review, 1918–19, pp. 58–60; for Canada, from the report of Vice Consul Robertson, Ottawa, made for the United States Tariff Commission, transmitted through the State Department. Where better information is not available, the proportions of the various kinds of wool are accepted as given in the British Blue Book, Cd. 9070, op. cit. The output is given in round numbers, as the object is to present the general situation.

[b] About one-half of Canada's output is English combing wool.

[c] English wools—"long" and "down."

Australia.

Many different types of wool are grown in Australia. The continent is large and has wide climatic variations. The variety of Australian wool which has been preferred in the United States is the fine quality Victorian, western district wool. This is exceptionally fine, light shrinking, and of long staple. "Port Phillip" and "Geelong" wools, popular in the United States, are grown in Victoria. The wool from the Tasmanian Merino is much like the wool from the western district of Victoria, but is of heavier shrinkage. Another section of Australia which is famous for fine wool is the Mudgee district of New South Wales. In South Australia, where pasturage is more sparse, the wool is of a "bolder" type—that is, it is longer and coarser. On the hot and dry plains of the "out-back" country, coarser wool is grown, because the fine Merino, containing much grease, retains more dirt than the coarse wool. Queensland, which is not thickly settled as yet, is predominantly a Merino section. The western part of that State is especially well suited to growing Merino wool on account of the dry climate. Defect in these wools is frequently caused by scarcity of vegetation, which robs them of soundness of fiber. The clips coming from the central and northern parts are usually dry and of "light condition." The more moist areas, especially near the coast, Darling Downs in Southern Queensland and Peak Downs in Central Queensland, are adapted to lamb raising and grow more of the crossbred wool. The increase of mixed farming is usually accompanied by a greater output of crossbred wool.[2] The Merino wool of West Australia is usually of the "bold" or "strong" type.[3]

The English breeds which are most popular in Australia are the Lincoln, Leicester, Border Leicester, Romney Marsh, Shropshire, Southdown, Hampshire, Suffolk, and Dorset Horn.[4]

New Zealand.

The climate of New Zealand is much like that of England and is particularly well adapted to the raising of crossbred sheep. Many grades and qualities of wool, suitable for almost all classes of worsted yarn, come from that country. The new type of sheep, the Corriedale, which is the result of crossing Lincolns and Merinos, is a product of New Zealand. These sheep have a mutton frame covered with a long staple fleece which resembles the "comeback" (3/4 blood Merino) type.[5] The small amount of Merino wool grown in New Zealand resembles the Victorian wool.

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[2] Hawkesworth, Alfred: Australasian Sheep and Wool, Sydney, 1911, p. 245.

[3] Queensland Sheep and Wool Industry, published by Government of Queensland, 1918, pp. 45, 78.

[4] Smith, H. B.: The Sheep and Wool Industry of Australasia, Chap. 2.

[5] Hawkesworth: op. cit., p. 246.

The following table shows the relative position of the Australian States and New Zealand in wool production:

TABLE III.—*Production of Wool in Australasia, 1918–19.*[a]

State.	Production.	Net weight.
	Bales.	*Pounds.*
New South Wales	952,471	308,209,901
Victoria	426,135	136,998,141
Queensland	314,348	101,060,738
South Australia	169,618	54,530,490
West Australia	130,981	42,109,081
Tasmania	37,363	12,011,820
Commonwealth	2,030,916	652,920,171
New Zealand	627,831	227,521,228
Australasia	2,658,747	880,441,399

[a] From Dalgety's Annual Wool Review (Australia), 1918–19, p. 60.

Argentina.

About 75 per cent of the wool grown in the Argentine Republic comes from crossbred sheep. Lincoln, Leicester, and Romney Marsh are the favorite sheep for crossing with Merino in that country. The crossbred Argentine wool grades principally medium and coarse, corresponding rather closely with "domestic quarter blood" and "domestic common" of the United States. The fine crossbred of Argentina corresponds with domestic three-eighths blood. About 20 per cent of the Argentine clip is Merino, while the remaining 5 per cent is from blackfaced sheep and from the native or "criolla" sheep. The last named class of wool comes largely from the Provinces of Mendoza and Cordoba. The northern part of the Province of Buenos Aires was formerly a source of supply of Merino wool from Rambouillet sheep, but as agriculture has increased the number of sheep has been reduced.[a] This Province still has by far the largest number of any section of Argentina, and crossbreds make up the greater proportion. The southern part of Argentina, however, is the place where the number of sheep is expected to increase.

The following table gives the number of sheep and the wool output in the principal wool-growing Provinces of Argentina in 1914. The number of sheep has been placed as high as 81,000,000 in some estimates, but judged by the quantity of wool exported, this is generally considered much too great.

[a] This is not always the result of an increase in agriculture as will be noted from other parts of the report, but it has been the case in Argentina.

TABLE IV.—*Sheep and Wool in Argentina, 1914.*[6]

Province or territory.	Number of sheep.	Annual production of raw wool, in pounds.
Buenos Aires and capital	18,785,957	136,386,800
Entre Rios	4,304,305	31,248,800
Santa Cruz	3,940,616	28,608,800
Rio Negro	2,802,282	20,345,600
Corrientes	2,348,584	17,050,000
La Pampa	2,282,823	16,572,600
Chubut	2,047,037	14,861,000
Cordoba	1,410,486	10,241,000
All others	5,303,362	38,504,400
Total	43,225,452	313,819,000

[6] Consul General Robertson, special report of August 19, 1919, made in answer to inquiry of the Tariff Commission, transmitted through State Department.

The number of sheep in Argentina increased only slightly in the years succeeding 1914. It was estimated at 44,855,000 in 1917.[7] The output of wool is estimated at present as about 330,000,000 pounds a year.[8]

Other South American Countries.

The number of sheep in Uruguay, according to the census of 1908, was 26,286,296, and the output of wool in 1914 was 143,293,000 pounds, chiefly Merino.[9] The clip of 1919 amounted to 90,000,000 pounds. According to the Uruguayan census of 1916, the number of sheep had declined to 11,472,852. This figure is so low as to cause doubt of its accuracy. There has, however, undoubtedly been a great decrease in the number of sheep in that country.

The wool production of other South American countries in 1919 was as follows:

TABLE V.—*Wool Production in Several South American Countries, 1919.*[10]

	Pounds.
Brazil	35,000,000
Chile	26,000,000
Peru	9,420,000
Falkland Islands	3,200,000

South Africa.

A large amount of good Merino wool comes from South Africa, but a considerable quantity of low-grade native wool is also grown there. Much improvement has been made in the wool in the last few years.[11] Pure-bred stock has been imported from Australia. The leading breeds of the country are the Rambouillet, Wanganella (Australian),

[7] Robertson: op. cit., July 9, 1919.
[8] Ibid.
[9] Bulletin Imperial Institute (London), Vol. XVI, No. 4, p. 478.
[10] Bulletin Nat'l Assoc. Wool Mfrs. (Boston), Jan., 1920, pp. 111–114.
[11] Bulletin Imperial Institute (London), Vol. XVI. No. 4, p. 487.

and Tasmanian,[13] and there are a few Karakuls and a small number of English sheep. The English breeds are mostly Romney Marsh, Lincoln, Leicester, Shropshire, and Suffolk. In addition to these the woolless sheep in the country number from 5,000,000 to 7,000,000. The wool clip in 1918 amounted to 157,761,470 pounds, but fell to about 125,000,000 pounds in 1919.[13]

TABLE VI.—*Number of Wool-bearing Sheep in South Africa, 1911–1918.*[14]

1911 (General census figures)	21,842,215
1912 (Department of Agriculture)	27,331,167
1913 (Department of Agriculture)	28,327,907
1915 (Department of Agriculture)	25,943,806
1916 (Department of Agriculture)	26,490,524
1918 (Census of agriculture)	25,058,718

Great Britain.

The "English" wools are of two principal varieties—the "long wool" and the "down wool." The leading varieties of the long wools are the Leicester, Lincoln, Cotswold, and Romney Marsh or Kent. The Leicester wool is long, lustrous, and curly, sometimes 12 inches in length. It is used for braids, linings, bright serges, and sometimes for women's dress goods. The Cotswold is much like the Lincoln and Leicester, but not so lustrous.

The down breeds are the Southdown, the Hampshire, the Suffolk, the Oxford down, and the Shropshire. These sheep are among the best producers of mutton and wool. The wool is finer and shorter than that of the long-wool breeds. The downs usually have brown, gray, or black faces and brown or black legs. They are rounder and plumper than the long wools, and therefore are better as mutton producers. The Southdown is one of the best mutton sheep in the world and has been much used for crossbreeding with other varieties of sheep to produce better mutton qualities. It is not a favorite breed where wool is the principal consideration, because of its light fleece.

The Hampshire is a large-boned, squarely built sheep, with black head and legs. It is found in south-central England. The more rapid growth and early development of the lambs of this breed have made it popular with sheep raisers who produce lambs to be marketed at five months of age or less.

The Shropshires are probably the most widely distributed of the English breeds. They are good farm sheep, as they are prolific, easily fattened, and bear a fairly heavy fleece of good and moderately fine down wool.

[13] Enslin, Gen. G. B.: Special Report on South Africa to the U. S. Tariff Commission.
[13] Bulletin Nat'l Assoc. Wool Mfrs., Jan., 1919, p. 66.
[14] Enslin: op. cit.

Among the many sheep in the Scottish highlands, in the Cheviot Hills. and along the border between England and Scotland, are the black-faced Highland breed, the Cheviot, and mixtures of Cheviot and Leicester blood. The pure-bred Cheviots, which are found in southern Scotland and in the northern counties of England, are medium sized, hardy, fairly good mutton sheep, and producers of soft wool of 3 to 4 inch staple which is used in making Cheviot cloths.

The number of sheep in the British Isles gradually decreased during the war. In 1918 the number was 27,063,000,[15] as compared with 31,164,587 in 1910.[16]

TABLE VII.—*Wool Production in the United Kingdom, 1916–1918.*[a]

Year.	Fleece wools.	Year.	Skin wools.[b]
	Pounds.		*Pounds.*
1916	94,990,000	1916	38,878,601
1917	96,652,000	1917	40,978,857
1918	92,182,000	1918	25,987,048

[a] N. Y. Daily News Record, Aug. 19, 1919.
[b] Wools pulled from the skins of slaughtered sheep.

Continental Europe.

During the war there was a considerable reduction in the flocks of Europe. The American Agricultural Commission, sent over in 1918, estimated the losses at about 7,500,000 sheep. This was partially offset, so far as world production is concerned, by an increase of 4,750,000 in non-European countries.[17] France suffered very severely. Her flocks decreased about 40 per cent from 1914 to 1919. (From 16,213,030 to 9,463,315.)[18] In Germany there was a decrease from 28,000,000 in 1860 to 7,907,173 in 1904 and to 5,504,195 in 1913,[19] but the number remained about stationary, or increased a little during the war. France and Germany developed two famous Merino breeds—the former the Rambouillet and the latter the Saxony Merino. Both countries now raise mostly the crossbred and down wool.

Russia, at present, grows chiefly low-grade crossbred and carpet wools. Although formerly the output of Merino wool was large, the number of Merino sheep has been declining since the eighties.

[15] Bulletin Nat'l Assoc. Wool Mfrs. (Boston), Jan., 1920, p. 112.
[16] Tariff Board Report on Schedule K (1911), p. 199.
[17] Report of American Agricultural Commission to Europe. (Washington), Jan. 16, 1919.
[18] Bulletin Nat'l Assoc. Wool Mfrs. (Boston), Jan., 1914, and Jan., 1919.
[19] Monthly Notes on Tariff Reform (British), Jan.–June, 1914, vol. 20, p. 290.

TABLE VIII.—*Number of Sheep in Russia, 1881–1913.*[a]

Year.	European Russia.		Caucasia.		Central Asia.		Siberia.	
	"Thick" wool (crossbred or carpet).	"Fine" wool (Merino).	"Thick" wool (crossbred or carpet).	"Fine" wool (Merino).	"Thick" wool (crossbred or carpet).	"Fine" wool (Merino).	"Thick" wool (crossbred or carpet).	"Fine" wool (Merino).
1881	17,800,000	17,034,000	.....	.....	.....	.....	.....	.....
1887	36,063,000	13,900,000	.....	.....	.....	.....	.....	.....
1897	40,000,000	7,148,000	.....	.....	.....	.....	.....	.....
1904	41,599,000	6,909,000	.....	.....	.....	.....	.....	.....
1909	38,000,000	2,790,000	10,540,000	2,166,000	21,200,000	220,000	6,005,000	4,000
1913	39,634,000	2,474,000	10,714,000	1,515,000	20,247,000	425,000	5,741,000	51,000

[a] N. Y. Daily News Record, Aug. 26, 1919. From official Report of Econ. and Textile Admn., in Moscow.

Wool-growing in Spain was on the increase during the war, owing to the stimulation of domestic manufacture and the difficulty of getting wool from abroad. Within recent years Oxford and Shropshire sheep have been introduced into Spain and crossed with Spanish sheep with good results.[20] Considerable Merino wool is still raised in that country, however. The Provinces of Leon, Segovia, and Estremadura produce Merino wool which is used in making fine worsteds. Burgos and Navarre furnish varieties peculiarly adapted to making cloth for civil and military uniforms, while in Andalusia and Aragon there is grown a long and strong Merino wool called "entrefinos." In Andalusia some very fine Merino wool is also raised.

The number of sheep in Italy before the war was 9,150,000, while in 1919 it was about 14,000,000.[21] In the northern part of Italy, especially in Apulia, there are some Merino sheep whose wool is short and fine.[22] The Pinerolo sheep of Piedmont also produce a valuable wool. The average weight of wool clipped from Italian sheep is light.

Austria, which had from two and one-half to three million sheep before the war, and Hungary, which had eight and one-half to nine million sheep,[23] have lost large numbers, although the precise amount of the losses is unknown. These countries produce considerable "carpet" wool. During the quarter century before the war, breeding sheep for mutton became more common. Purebred mutton sheep were imported into Hungary from England. There was some production of Merino wool also. The Merino sheep of Hungary are known as the "Racka" sheep.[24]

[20] Bulletin Imperial Institute (London), Vol. XVI, No. 4, p. 480.
[21] Ibid., p. 479, and Bulletin Nat'l Assoc. Wool Mfrs. (Boston), Jan., 1920, p. 112.
[22] Int. Inst. of Agric. (Rome), Apr., 1913, pp. 616–617.
[23] Canada Agric. War Book, 1915; cf. Bulletin Nat'l Assoc. Wool Mfrs., Jan., 1920, p. 112.
[24] Int. Inst. of Agric. (Rome), May, 1913, pp. 680–688; Rovacsy, Dr. Bela: Sheepbreeding in Hungary.

Denmark had 877,000 sheep in 1913.[25] Cooperative sheep breeding has been carried on there successfully.[26] Iceland and the Faroe Islands have about one hundred thousand long-wool sheep.[27] The number of sheep in Norway has been decreasing somewhat—from 1,326,850 in 1914[28] to 1,281,000 in 1916.[29]

Sheep-breeding has been increasing in Sweden, where there were in 1917[30] 1,344,000 head. Merinos used to be numerous, but only a few hundred are now found in the whole country. Cheviot rams from Scotland have been used in late years. Oxfords, Shropshires, and Southdowns are found in southern and central Sweden.[31]

The Dominion of Canada.

Canada produces a good grade of long-staple combing wool. The English breeds are better suited to the climate than the Merinos. Crossing of English and Merino sheep has been practiced to some extent, but the sheep of Canada are predominantly of the English breeds. There are only about 200,000 sheep kept under range or ranching conditions (in southwestern Saskatchewan and southern Alberta). The rest are scattered about the country on farms, in flocks averaging about 25 head. Canadian wools may be divided into eastern and western "domestic" wools and range wools. Fort William, Ontario, is the point which is designated as the dividing line between east and west for the purposes of classification. The number of sheep in Canada in 1918 was 3,052,748, about the same as in 1871.[32] The wool clip was 14,000,000 pounds in 1917 and 15,000,000 pounds in 1919.[33]

Mexico.

Mexico is unimportant in wool production. Its sheep shear an average of only about 2 pounds of wool, and its output of 6,500,000 pounds is largely used at home. The United States, however, frequently imports over a million pounds a year from this source.

The United States.

The quantity of wool produced annually in the United States has remained practically the same for the past 35 years. The domestic product amounted to about 300,000,000 pounds in 1883, and it has since not usually varied from this figure by as much as 20,000,000

[25] Haggard, Henry Rider: Rural Denmark and its Lessons (New York), 1913, p. 183.
[26] Faber, Harold: Cooperation in Danish Agriculture (London), 1918.
[27] Great Britain, Consular and Diplomatic Reports, 5382 (1914); and Bulletin Nat'l Assoc. Wool Mfrs., Jan., 1919, p. 64.
[28] Great Britain, Journal of the Bd. of Agric., 1916–17.
[29] Bulletin Nat'l Assoc. Wool Mfrs. (Boston), Jan., 1920, p. 112.
[30] Ibid.
[31] Int. Inst. of Agric. (Rome), Agric. in Sweden, 1914, p. 1278.
[32] Report of Vice Consul Robertson (Ottawa), Sept. 25, 1919.
[33] Bulletin Nat'l Assoc. Wool Mfrs., Jan., 1920, p. 114.

pounds. The smallest annual product during that period was in 1897, when the total clip amounted to only 259,000,000 pounds, and the largest was in 1893, when 348,000,000 pounds were secured from domestic sources. In most years the output has been very close to the 300,000,000 mark, which was reached nearly four decades ago.

The following figures show by five-year averages the annual domestic production of raw wool since 1885:

TABLE IX.—*Wool Production in the United States by Five-Year Averages, 1885–1919.*

Years.	Pounds.
1885–1889	310,491,000
1890–1894	324,669,000
1895–1899	272,967,000
1900–1904	297,343,000
1905–1909	306,349,000
1910–1914	306,064,000
1915–1919	295,400,000

The western ranches and the Ohio region still produce mainly the wools in which the Merino characteristics are strongly marked. In all other sections of the country the blood of the English mutton breeds has had the greatest influence.

PRODUCTION OF CARPET WOOL.

Russia, Turkey and the Balkan States, India, and China produce two-thirds of the world's output of carpet wool. The rest comes in limited quantities from many countries.[34]

TABLE X.—*Output of Principal Carpet-Wool Producing Countries, 1919.*[34]

	Pounds.
Russia in Europe	[35] 320,000,000
Russia in Asia	[35] 113,359,000
Turkey in Europe and Balkan States	90,500,000
Greece	16,000,000
Turkey in Asia	90,000,000
British India	60,000,000
China	50,000,000
Persia	12,146,000
Algeria	33,184,000
Tunis	3,735,000
Total	788,924,000

WORLD TRADE IN WOOL.

Although almost all countries produce some wool, the surplus for export (of wool suitable for making clothing) is found chiefly in

[34] Bulletin Nat'l Assoc. Wool Mfrs., Jan., 1920, p. 114.
[35] Not all carpet wool.

Australasia, South Africa, and South America. This surplus went, before the war, principally to the United States, Great Britain, France, Germany, Austria-Hungary, Belgium, Italy, and Japan. Australia, South Africa, and Uruguay supply the bulk of the Merino wool; Australia, New Zealand, and Argentina crossbred wool; Asia, southeastern Europe, and northern Africa the carpet wool. London was before the war the greatest world market for wool, and the auctions in Coleman Street had an influence on prices the world over.[36] During the war these auctions were suspended, but they have been renewed and bid fair to regain a large share of their old importance. The dominance of the London auctions had been considerably lessened, however, before the war, by the auctions in Australia. In Sydney, Adelaide, Melbourne, Geelong, and Brisbane, the leading auction cities of the Commonwealth, more Australian wool was sold than in England. These auctions also ceased during the war on account of the purchase of Australian wool by the British Government.

Liverpool is a great market for India carpet wools. Before the war Antwerp, also, was one of the great wool markets. The imports at that center came principally from South America and Australia, and a large proportion was sold to Germany.[37] A large amount of wool was retained in Belgium to be scoured, combed, and carded before reexport. The center of the wool manufacturing district in Belgium was Verviers and in France the Roubaix-Turcoing district. Mazamet, France, was famous for the preparation of skin wools. Boston is the leading American wool market,[38] while Philadelphia and New York are prominent carpet-wool centers.

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[36] The sale takes place in one large room in the wool exchange on Coleman Street, some distance from the warehouses where the wool is stored. Selling begins at 4 o'clock precisely. The room is constructed similar to an amphitheater, all the seats facing the auctioneer's desk and rising abruptly toward the back, so that each row of intending buyers may see and be seen distinctly. Auctioneer, broker, and clerk take their respective seats at the desk, while press reporters are also seated at the front in the extreme right and left corners. The densely packed audience is as quiet and sober as a church congregation, with the exception of a keen, eager look in their eyes indicating the intensity of suppressed excitement within. The moment the first lot is called out, they burst forth in one wild chorus of yells and howls, and may continue shouting and gesticulating in a frantic manner until that particular lot is knocked down. For a fraction of a minute there is dead silence again until you can almost hear your heart beat. In that brief moment the buyer's name and the price of the lot has been recorded. Suddenly the subdued but clear metallic voice sounds the next number from the desk and immediately a dozen or more excited bidders leap to their feet, shouting louder than before and continue those hideous yells and frantic movements for about 20 seconds until that lot is knocked down and so on. Excitement on the stock exchange is tame compared with it, whilst the excitement at a heated election meeting is mere child's play compared with the terrific eagerness displayed here. We met an Australian coming out one afternoon and he said, 'We call our wool sales in Sydney the dog fight, but this is the world's menagerie turned loose.'—Description of London Auction. Report on The Sheep Industry in Canada, Great Britian, and the United States, Dominion of Canada, Dept. of Agric., 1911, p. 105.

[37] Bulletin Imperial Institute (London), Vol. XVI, No. 4, p. 511.

[38] Four hundred and eighty-seven million pounds of wool were received in Boston in 1918.

Great Britain was the leading exporter of manufactures of wool before the war. The United States made great progress in this respect during the war, but trade will no doubt be to some extent readjusted. The German exports of wool manufactures had increased greatly in the years just before the war. Woolen mills have been established in Canada, Japan, Australia, New Zealand, South America, British India, and China. These supply part of the home demand, or have even exported a little, as did Japan during the war. In Russia, the Balkan States, the Turkish Empire, Persia, India, and China the hand-loom industry uses large quantities of wool.[39]

TABLE XI.—*World Trade in Manufactures of Wool, 1912.*[a]

Country.	Imports.	Exports.	Country.	Imports.	Exports.
United Kingdom	$33,452,321	$126,840,456	Dutch East Indies	$554,781	.....
Germany	13,669,998	69,347,625	Other eastern countries	973,300	.....
France	9,041,957	37,121,662	French colonies	1,946,600	.....
Austria-Hungary	9,066,289	13,645,666	Morocco	486,650	.....
Italy	7,903,196	2,584,111	United States	15,115,350	$1,635,144
Switzerland	7,358,148	1,946,600	Argentina	9,017,625	.....
Netherlands	7,898,330	8,404,445	Brazil	2,919,900	.....
Belgium	7,212,153	2,248,323	Chile	5,314,218	.....
Russia	8,389,846	.....	Peru	559,648	.....
Sweden	2,681,441	.....	Mexico	1,528,081	.....
Norway	3,932,132	.....	Other American countries	3,406,550	.....
Denmark	5,455,347	97,330	Egypt	4,379,850	.....
Spain	1,459,950	768,907	British India	8,273,050	1,070,630
Portugal	1,630,277	.....	Hongkong	2,433,250	.....
Roumania	7,436,012	.....	South Africa	5,839,800	.....
Bulgaria	1,226,358	447,718	Australia	14,599,500	.....
Serbia	783,506	.....	New Zealand	3,211,890	.....
Greece	1,703,275	.....	Canada	21,704,590	.....
Turkey	8,273,050	2,919,900	Other British possessions	2,919,900	.....
Japan	4,866,500	.....			
China	4,866,500	.....	Total	254,834,273	273,545,964
Persia	1,343,154	4,467,447			

[a] Bull. Imp. Inst. (London), Vol. XVI, No. 4, p. 498.)

The United States exported manufactures of wool to the value of $19,928,071 in the calendar year 1918 and $47,832,768 in 1919. Manufactures of wool imported for consumption in those years were valued at $22,725,011 and $18,530,450, respectively.[40] In 1918 Great Britain exported manufactures of wool to the value of $195,683,436, while imports were unimportant. The figure for exports does not include the value of woolen manufactures for the use of the British expeditionary forces.[41]

WOOL IMPORTS OF THE UNITED STATES.

Except during the war, imports of wool have not fluctuated a great deal for the past 15 years. In 1908 the business depression following the panic of 1907 caused a decrease, and in 1911 there was a drop caused by a stagnant condition of the market which has

[39] Bull. Imp. Inst. (London), No. 4, Vol. XVI, pp. 496–497.

[40] U. S. Commerce and Navigation Reports for calendar years 1918 and 1919.

[41] Annual Statement of the Trade of the United Kingdom with Foreign Countries and British Possessions, 1918; cd. 342, 1919. Table 17.

been ascribed to a fear of impending tariff changes. Before the war imports were somewhat in excess of 200,000,000 pounds a year. A year of small importations has usually been followed by a year or two in which the excess was large enough to make up for the previous deficiency.

Tables XII to XIV permit a further analysis of the wool imports of the United States. In studying these tables it should be borne in mind that before the war somewhat more than one-half of the imports of "Class II wools" consisted of mohair from Turkey and the Cape of Good Hope, and camel, vicuna, and similar hairs from Asia and South America. Reexports of these hairs made up the major part of the Class II products which came from the United Kingdom. The remainder was real "English wool." The Class I wool, which came from the United Kingdom, consisted, of course, of reexports of Australian and South American wool, while the Class III wool imported from the same source came originally from Asia and eastern Europe.

It will be seen that prior to the war Russia, Turkey, and China were the principal sources of Class III wools. During the war imports of this kind from the first two countries greatly decreased, while China became the principal source of our imports. Increased quantities of Class III wools have also come from the United Kingdom and Argentina.

Table XII reflects the normal or prewar state of affairs. It should be compared with Table XIII, showing the situation in 1919.

TABLE XII.—*Imports of Wool into the United States—Average, 1912–1914.*

[Calendar year.]

Country.	Class I, "Clothing."	Class II,[a] "Combing."	Class III, "Carpet."	Total.
	Pounds.	*Pounds.*	*Pounds.*	*Pounds.*
Total	87,843,602	17,666,968	106,603,709	212,114,279
Argentina	25,004,768	442,364	4,072,948	29,520,080
Australia	14,137,023	78,629	52,211	14,267,863
Canada	117,133	1,808,088	10,287	1,935,508
China	36,353	2,408	32,627,091	32,665,852
France	1,841,186	7,036	4,116,804	5,965,026
New Zealand	4,647,050	83,304	.....	4,730,354
Russia in Asia	.....	.....	6,328,625	6,328,625
Russia in Europe	2,950	89,163	16,975,623	17,067,736
Turkey in Asia	9,599	7,167	6,851,809	6,868,575
Turkey in Europe	.....	1,101,810	2,192,106	3,293,916
United Kingdom	35,173,516	12,791,848	22,042,858	70,008,222
All others	6,874,024	1,255,151	11,333,347	19,462,522

[a] Includes hair of the Angora goat, etc.

TABLE XIII.—*Imports of Wool into the United States, 1919.*[a]

[Calendar year.]

Country.	Class I, "Clothing."	Class II, "Combing."[b]	Class III, "Carpet."	Total.
	Pounds.	*Pounds.*	*Pounds.*	*Pounds.*
Total	334,099,538	14,844,972	96,948,324	445,892,834
Argentina	118,854,446	2,087,101	14,045,112	134,986,659
Australia	46,034,615	31,798	.....	46,066,413
British South Africa	51,466,180	3,997,177	2,386,257	57,849,614
Canada	12,066,657	650,924	98,310	12,815,891
Chile	11,959,417	636,745	13,274,457	25,870,619
China	8,528,802	642,970	29,813,744	38,985,516
Ecuador	175,600	.....	408,221	583,821
France	379,377	.....	377,723	757,100
Iceland and Faroe Islands	266,215	.....	705,800	972,015
Japan	390,855	.....	118,534	509,389
New Zealand	14,234,386	.....	.....	14,234,386
Peru	2,273,308	1,109,053	1,540,691	4,923,052
Russia in Asia	77,220	252,900	1,129,031	1,459,151
Spain	164,750	22,046	915,031	1,101,827
United Kingdom	14,704,025	3,382,806	19,044,860	37,131,691
Uruguay	49,931,366	340,625	7,030,790	57,302,781
All others	2,592,319	1,690,827	6,059,673	10,342,909

[a] U. S. Commerce and Navigation Report, 1919. [b] Includes hair of Angora goat, etc.

TABLE XIV.—*Imports of Wool into the United States, July 1, 1919, to June 30, 1920.*

	Pounds.
Class I, "Clothing"	337,212,109
Class II, "Combing"	9,956,344
Class III, "Carpet"	72,225,748
	419,394,201
Hair of Angora goat, etc	8,183,837
Total	427,578,038

Ports of Entry for Wool.

Boston is the leading port in the importation of wools of Classes I and II, but more of the Class III wools are landed at New York. Philadelphia is the port of entry for about as much of the Class II wool as is New York, and nearly as much of Class III wool as Boston. In 1915 and 1916 considerable wool brought directly from Australasia was landed in San Francisco, which in 1915 was ahead of Philadelphia, and only of less importance than Boston and New York as a port of entry for wool; in 1916 it stood second to Boston.

The woolen and worsted mills of the United States are concentrated largely in New England and the Middle Atlantic States, and it is partly on account of their proximity to the manufacturing sections that Boston and Philadelphia are the two great wool markets of the country. The leading States in wool manufacture were, in the order of their importance in 1914, Massachusetts, Pennsylvania, Rhode Island, New York, New Jersey, Connecticut, Maine, New Hampshire, Ohio, and Vermont. These 10 States produce about 95 per cent of the manufactures of wool in the United States. Massachusetts alone,

in 1914, produced nearly one-third, $141,329,858 out of a total $464,249,813 and New England produced about one-half of the total.

Imports of Important Substitutes.

Before the removal of the duty in 1913, the importations of wool substitutes were very small. Since then they have been much larger although they are small when compared with the total imports of raw wool.

TABLE XV.—*Imports into the United States of Rags, Mungo, Flocks, Noils, Shoddy, and Waste, 1912–1918.*

Year.	Quantity.	Value.	Year.	Quantity.	Value.
	Pounds.			*Pounds.*	
1912 ..... dutiable..	362,307	$168,007	1915 ..... free..	4,620,534	$847,694
1913 ..... do....	345,394	162,848	1916 ..... do....	4,569,621	1,215,207
1914 Free	6,797,237	1,049,716	1917 ..... do....	4,612,443	1,668,333
1914 Dutiable	101,845	55,091	1918 ..... do....	3,184,169	1,289,400

THE WOOL TRADE OF GREAT BRITAIN.

The following tables furnish data for a more careful analysis of the wool trade of the British Isles:

TABLE XVI.—*Imports of Wool into the United Kingdom, 1913–1916*
(000 omitted.)

Country of origin.	Port.	1913	1914	1915	1916
		Pounds.	*Pounds.*	*Pounds.*	*Pounds.*
Grand total	.....	800,580	712,617	926,379	618,946
From foreign countries (total)	.....	158,970	115,307	87,924	54,022
Principal foreign sources.					
Asiatic Turkey	.....	8,773	3,823	866	2,703
China	.....	2,316	1,277	1,155	418
United States	.....	2,582	4,726	2,372	289
Uruguay	.....	9,657	1,729	1,122	879
Argentina	.....	55,435	45,906	60,968	31,782
Chile	.....	24,288	18,007	15,278	8,115
All others	.....	55,901	39,839	6,163	9,836
From British possessions (total) ..	.....	641,610	597,310	838,455	564,924
Principal British sources					
Cape of Good Hope	Port Elizabeth, East London...	92,813	81,870	9,466	62,811
Natal	Durban Delagoa Bay	40,410	39,792	41,898	27,260
British India	Calcutta, Bombay	54,946	46,982	65,432	64,793
Australia	Sydney, Melbourne, Brisbane, Adelaide.	265,078	239,233	426,163	241,722
New Zealand	Wellington, Auckland	181,181	184,607	200,031	157,852
Falkland	Port Stanley	6,150	4,454	3,045	4,352
All others	.....	1,032	372	92,420	6,134

TABLE XVII.—*Exports and Reexports of Wool from Great Britain, 1913–1916.*

(1) EXPORTS OF WOOL GROWN IN GREAT BRITAIN.

(000 omitted.)

Country of destination.	1913	1914	1915	1916
	Pounds.	*Pounds.*	*Pounds.*	*Pounds.*
Grand total	335,142	333,533	154,935	58,486
Total exports	28,662	38,458	32,002	13,114
United States	8,689	20,768	22,554	3,146
Canada	2,307	2,330	3,660	3,779
Russia	4,161	5,906	1,126	1,407
Germany	8,051	2,900	.....	.....
all others	5,454	6,554	4,662	4,782

(2) REEXPORTS OF WOOL FROM GREAT BRITAIN.

Total reexports	306,480	295,075	122,933	45,372
Principal places.				
Russia	383	154	7,328	6,879
Germany	93,197	80,785	.....	.....
France	86,073	59,646	20,738	13,136
Italy	925	806	8,857	4,221
United States	44,536	85,842	77,207	12,140
Canada	2,566	2,457	4,614	3,448
All others	78,800	65,385	4,189	5,548

PRICES.

Prices of Wool from 1860 to 1914.

As a result of changing industrial conditions, the general tendency in wool prices was to fluctuate greatly during this period of more than half a century. The average price of wool was comparatively high at the beginning of the period. At that time the resources of the wool-growing regions of the Southern Hemisphere were just beginning to develop. Eighteen hundred and sixty-nine was the first year in which as many as 500,000 bales of wool (of 330 pounds each) were sent from Australasia to Europe and America.

During the Civil War period the demand for wool to clothe the Army caused an increase in the price in this country to more than a dollar (currency) a pound. In 1867 there was a sharp break in the price, and there ensued a low level of world prices for wool until 1871. The 20 years 1871–1890 was an era marked by a great development of sheep raising in our far West, where there were two periods of high prices. The first was during 1871 and 1872, and one of the principal causes seems to have been the Franco-Prussian War. In addition, however, the world supply was expanding less rapidly than the demand during the years just preceding 1871. Prices for wool in the United States declined from 1873 until 1879, the panic of 1873 helping the downward trend. In England the price declined from 1875 until 1879. The next period of high prices, beginning in the latter part of 1879 and lasting only until 1880–81, was caused by

the revival of business in this country. There followed a high domestic price which was reflected by a rise in the London price.

The supplies of wool from the Southern Hemisphere were increasing very fast during the eighties and prices took another downward turn in 1891. In 1893 came the panic with results which lasted for some time. With the revival of business in the closing years of the nineteenth century wool prices rose somewhat, but from 1901 to 1910 the average price was below that for the years 1840–1890, if the Civil War period be left out of consideration.[42] Even the drought in Australia (1902) did not raise the price very much. This may be ascribed partly to the rapidly growing competition of cotton with wool during these years.

The Price of Wool During the War.

During the late war the price of wool reached the highest point ever attained either in this country or abroad. The tendency of the price in this country was slightly downward in December, 1913, after the removal of the duty on wool became effective on December 1. Most of the decrease had been discounted, however, during the two years preceding the passage of the act. The price recovered early in 1914, and upon the outbreak of the war in Europe showed an immediate upward tendency. Complete control of the situation was reached in England in 1916 by the purchase of domestic and colonial clips and control of the use of wool.

Although the prices of the various grades of wool reached a high point in this country in 1916, and were accompanied by the largest imports which we have ever experienced, the entry of the United States into the war was an even greater stimulus to prices. "Territory fine medium scoured" reached $1.82 per pound. In 1917 there was a great deal of speculation in wool. Many of the western woolgrowers sold their clip much in advance of the shearing time, and the future supplies often changed hands several times, with an increase in price each time.

The wool dealers of Boston offered their stocks to the Government at the current prices soon after the entry of this country into the war, but the Government did not avail itself of the offer. During all of 1917 prices were climbing steadily, but the Government was slow in assuming control of the wool market. The British Government took control of wool stocks at a much earlier stage than did our Government, with the result that the level of prices became much higher in this country than abroad.

[42] Wright, Chester Whitney: Wool-Growing and the Tariff, Harvard Economic Studies, Vol. V (Cambridge, 1910), p. 276.

The War Trade Board was empowered to limit the importation of wool by licensing it, and the Government was given the option of purchasing the imported wool. It did not exercise its option for several months, but finally did so in the spring of 1918, and in May of the same year commandeered the domestic clip and fixed as the purchase price of the several grades the market quotations for July 30, 1917. This price was nearly, although not quite, the highest level that was reached.

TABLE XVIII.—*Valuations of Domestic Wool, July 30, 1917.*

[Prices at Boston, scoured basis.]

TERRITORY.

	Choice.	Average.	Inferior.
Fine and fine medium staple	$1.80	$1.75	$1.70
Fine and fine medium clothing	1.70	1.65	1.62
¾ blood staple	1.68	1.63	1.60
¾ blood clothing	1.60/1.62	1.58	1.53
High ½ staple 56/58s	1.45	1.42	1.40
High ½ clothing 56/58s	1.42	1.39	1.37
½ staple 56s	1.40	1.37	1.35
½ clothing 56s	1.37	1.34	1.32
Low ½ staple 50/56s	1.35	1.32	1.30
Low ½ clothing 50/56s	1.32	1.29	1.27
High ¼ staple 48/50s	1.32	1.29	1.27
High ¼ clothing 48/50s	1.30	1.27	1.25
¼ blood staple 46/48s	1.28	1.26	1.24
¼ blood clothing 46/48s	1.26	1.24	1.22
Low ¼ staple 44s	1.17	1.15	1.13
Common and braid 40s	1.07	1.05	1.03

TEXAS.

Twelve months	$1.75	$1.70	$1.65
Eight months	1.55	1.50	1.45
Six months	1.50	1.45	1.40

So-called coast wools and border Mexicans must be scoured in all cases.
Medium Texas to be classified as Territory according to the character of the lot.

CALIFORNIA.

	Choice.	Average.	Inferior.
Twelve months	$1.70	$1.65	$1.60
Eight months	1.50	1.45	1.40
Fall	1.40	.....	1.15

Medium California to be classified as Territory according to the character of the lot.

OHIO AND SIMILAR.

[Including New England States, New York, Pennsylvania, West Virginia, Michigan, New Jersey, Delaware, and Maryland.

	Choice.	Average.
Fine Delaine	.....	$1.85
Fine clothing	$1.75	1.70
¾ blood staple 58/60	.....	1.68
¾ blood clothing	.....	1.60-1.62
½ staple	.....	1.45
½ blood clothing	.....	1.42
¼ blood staple	.....	1.32
¼ blood clothing	.....	1.30
Low ¼	.....	1.17
Common and braid	.....	1.07

TABLE XVIII.—*Valuations of Domestic Wool, July 30, 1917*—Continued.

MISSOURI, INDIANA, ILLINOIS, AND SIMILAR.

[Including Iowa, Wisconsin, Minnesota, Kansas, Nebraska, and Arkansas.]

	Choice.	Average.
Fine Delaine		$1.80
Fine clothing	$1.70	1.65
¾ blood staple	1.63	1.60
¾ blood clothing	1.60	1.57
½ staple	1.40	1.37
½ clothing	1.37	1.34
¼ blood staple	1.28	1.26
¼ blood clothing	1.26	1.24
Low ¼	1.17	1.15
Common and braid		1.07

SEMI-BRIGHT.

Semi-Bright is to be classified as Territory of Fleece according to the character of the lot.

GEORGIA AND LAKE WOOLS.

	Choice.
Average lots, largely ¾	$1.25
Average lots, largely ¼ blood	1.20

Prices Since the Armistice.

It was expected that the price of wool would decline rapidly after the signing of the armistice. And this occurred, as the Government quickly canceled its contracts with the mills, 909 of which had their machinery working on war contracts. The market soon recovered, however, following the resumption of the London sales, in April, 1919. The price of fine Merinos advanced rapidly; that of medium wools was fairly strong; the lower grades declined in price and did not sell readily even at the reduced prices. The same tendency was observed at the auction sales of Government-owned wool in this country. There were periods when the general level of wool prices fell, but the market for fine wools, on the whole, remained exceedingly active and prices were good until the spring of 1920.

Chapter 3.

WOOL CONTROL DURING THE WAR.

GREAT BRITAIN.

Great Britain has been the leading wool market of the world for many years. In considering the control of wool during the war, it is of prime importance to know what measures were adopted in that country.

The wool clip of the United Kingdom averaged about 125,000,000 pounds a year, before the war, less than one-fourth the consumption of its mills.[1] Sheep had been decreasing in numbers for several years, chiefly because of the greater profit of keeping dairy cows.

Of more importance than the effect of the war on the domestic clip is the influence which the British Government exerted on the disposal of the colonial wool. When communications were blocked at the outbreak of the war, large stocks of wool which were intended for European mills were kept in England.[2] The price dropped and wool trading and manufacturing were temporarily at a standstill. The spinning branch, in particular, was disturbed, as the exports of yarn to Germany had been large. It was not long after the war began, however, before orders placed in England by the Governments of France and Russia, as well as by the home Government, acted as a great stimulus to business.[3]

During the summer and autumn of 1914, rigid restrictions were placed on the exportation of wool and woolens from England, and on wool, especially crossbred, from the colonies, to prevent supplies from coming into possession of the Central Empires.[4] An embargo was placed on the shipment of wool from Australia to the United States,[5] but in March, 1915, wool was made contraband of war, instead, and American buying in the colonies was thus again allowed.[6]

During 1915 about 900,000,000 pounds of wool were retained in Great Britain, whereas normal prewar consumption had been about 550,000,000 pounds.[7] The Army demand had risen to great pro-

[1] Bulletin Nat'l Assoc. Wool Mfrs., 1915, Vol. XLV, p. 59.
[2] London Statist, Sept. 26, 1919, pp. 639–640.
[3] British Trade Review, Jan. 1, 1915.
[4] London Statist, Sept. 26, 1919, pp. 639–640.
[5] British Trade Review, Mar. 1, 1915, p. 145.
[6] Ibid., Feb. 1, 1915, p. 82.
[7] British Blue Book, Cd. 8447, p 13.

portions and the exports of woolen and worsted manufactures to France to eight times the prewar amounts.[8] By the end of 1915 the price of wool, which had fallen during the first two months of the war, had risen to a level much higher than that of prewar times. The enormous war orders and the great civilian demand due to the increased prosperity of the working classes rapidly reduced the surplus of 1915, and in 1916 a shortage began to threaten.[9]

The British Government placed its contracts at first through competitive bidding of wool-manufacturing concerns. The advantages of this method disappeared when the orders placed were greater than the amounts which manufacturers could agree to assume. Moreover, when manufacturers were willing to forego high profits on war work, their competitors in the civilian trade were able to offer greater inducements to labor.

In February, 1916, the Government undertook one of the important measures which were gradually to bring it into entire control of the wool situation. The War Office was empowered to requisition the whole or any part of the output of a firm,[10] and this immediately raised the question of the price to be paid for the requisitioned goods.[11] The Government set about determining costs of production and found that it was faced with very difficult problems, because of the great variety of goods and the different conditions existing in the various branches of the trade. The steadily rising price of raw material was also one of the chief difficulties. In figuring cost, current prices of wool had to be used, since varying prices had been paid by manufacturers. In a rising market, this put the Government at a disadvantage.[12] The first stage, therefore, that of requisitioning goods from the manufacturers, led to the second stage, which was fixing a price for the raw material. The threatened shortage of the raw material was another excellent reason for assuming control of the supply. Accordingly, in May, 1916, it was decided to purchase the whole of the British clip which was then being shorn.[13]

The price of the British clip was fixed at 35 per cent above the level of prices prevailing in July, 1914.[14] The purchase was carried out under the direction of a body called "The Central Advisory Wool Commission," which had various local boards under its direction. The Government advanced 75 per cent of the value of the wool as soon as it was inspected and passed, and the rest of the purchase price was paid when the wool was sorted and the original

[8] Economic Journal (London), March, 1918 (article by Dorothy Zimmern, The Wool Trade in War Time).

[9] London Statist, Jan. 22, 1916, pp. 155, 156, and Apr. 22, 1916, p. 735.

[10] British Order in Council, Feb. 15, 1916.

[11] British Blue Book, Cd. 8447, p. 13.

[12] Ibid.

[13] S. Commerce Reports, June 12, 1916.

[14] London Statist, Jan. 13, 1917, p. 79.

estimate of value confirmed.[15] This wool was distributed to spinners and manufacturers to use for Government orders, so far as it was suitable, at fixed rates based on the price of the wool. The portion which was not suitable for military cloth was sold for civilian use at somewhat higher prices.[16]

Restrictions had again been placed upon exports in the spring of 1916,[17] but it was evident that partial control of the wool supplies, even with restriction of exports, would not be sufficient, as the British clip amounted to only one-ninth of the 1915 consumption.[18] In November, 1916, the Imperial Government made an arrangement with the colonial Governments to purchase the whole of the Australasian clip.[19] The first proposal of the British Government was to buy the crossbred wool only, but the colonial Governments maintained that it was not practicable to differentiate between the growers of Merino and of crossbred wool and so the Government agreed to buy the whole clip.

To complete this control of the supply of raw material the war office took possession, during the spring of 1917, of all stocks of crossbred and Merino wool in the United Kingdom except those which were already held for the purpose of manufacture by the holders.[20] It was also provided by an order in council of April, 1917, that any wool which was imported must be offered for sale to the director of army contracts.[21] The clip of the Falkland Islands and part of that of Iceland were purchased.[22]

In 1916, arrangements were made with the Government of India whereby East Indian wool, practically the whole of which is normally sold in the British market, was distributed under Government control at a schedule of prices agreed upon between the Government of India and the war office. All export from India, save to the United Kingdom, was prohibited. By the request of the Indian Government this arrangement was discontinued in 1919.[23]

Another radical move was the cessation of the London wool sales by order of the Government in December, 1916. This was not so revolutionary, however, as it would have been a few years previous, because during the 20 years preceding 1916 the wool sold at auction in London decreased from 70 per cent of the whole amount imported to 30 per cent, most of the wool at the later date going directly from

[15] London Statist, July 8, 1916, pp. 78–79.
[16] Economic Journal (London), Mar., 1918, p. 16.
[17] Gray, Howard L.: War Time Control of Industry, p. 107.
[18] British Blue Book, Cd. 8447, p. 14.
[19] British Trade Review, Jan. 1, 1917, p. 41.
[20] Economic Journal (London), Mar., 1918, p. 17.
[21] Gray: op. cit., p. 112.
[22] British Board of Trade Journal, July 4, 1918.
[23] The London Times Trade Supplement, Saturday, Jan. 31, 1920, p. 519.

the colonies to the manufacturer.[24] For about three months the procedure followed was for the Government to take over all its requirements of wool at a fixed price, leaving the balance to be offered to the public by auction, but in March, 1917, all auctions ceased and wool was only issued at fixed prices.[25]

Several committees, representing all sections of the trade, had assisted the Government in arranging the details of purchase of the Australian clip. These committees were combined with the Central Wool Advisory Committee in the spring of 1917. This committee recommended to the Government the adoption of a more stringent policy of conserving supplies, even to the extent of rationing manufacturers or consumers. This recommendation was made necessary by the shipping situation.[26]

Only 593,000,000 pounds were retained in the United Kingdom for consumption in 1916.[27] It was necessary to supply the Army and it was also desirable to maintain the export trade, as far as possible, to bolster up the foreign exchange situation. In order to maintain both these branches of the trade and also to keep a safe reserve of wool, the civilian home consumption had to be curtailed.

All the wool was issued to the manufacturers by the Government. For Government contracts, the price was fixed at a small margin above the cost; the wool for civilian uses was issued at the price prevailing in January, 1917, which was about 20 per cent above the military issue price.[28] This discrepancy was maintained because the Government did not want to upset the trade, preferring to take a profit on the sale of raw wool. In order to save handling, the policy of direct delivery of wool to manufacturers was followed; and to stabilize trade, issue prices were fixed for periods of six months. The Government also took over the function of top making and sold tops to the worsted spinners just as it sold wool to the woolen manufacturers.[29]

The entry of the United States into the war meant a widening of the demand for wool for military clothing. It was necessary to extend, by an order of April 14, 1917, the priority scheme which gave preference to the military orders of Great Britain or the Allies. This order was followed soon after by an Army council order of May 24, 1917, reducing the working time in woolen and worsted manufacture to about 35 hours per week.[30] There was not much objection to the 45-hour-week schedule, but when it was found that not enough wool could be secured to keep the industry busy, even for

[24] Manchester Guardian, Nov. 28, 1916, p. 9.
[25] U. S. Commerce Reports, Feb., 1917, p. 745.
[26] British Trade Review, Mar., 1917, p. 122.
[27] British Board of Trade Journal, July 4, 1918.
[28] British Blue Book, Cd 8447, p. 15.
[29] British Board of Trade Journal, July 4, 1918.
[30] Ibid.

that length of time, there was considerable protest.[31] The discontent in the industry grew, and led to a reorganization, in August, 1917, of the Government machinery for handling both the raw wool and the manufactures of wool. All arrangements for the purchase and transport of the wool and the making of tops were centralized in London in the hands of the Controller of Wool Supplies and under the immediate supervision of the Director of Raw Materials. The Government kept the ultimate decision regarding the price, necessary reserve of wool, and the allocation of Government contracts.[32]

The Government had, meanwhile, continued the policy of purchasing the domestic and colonial clips. The price paid for the 1917 clip of the United Kingdom was 50 per cent,[33] and for the 1918 clip 60 per cent above the 1914 level.[34] Payment was more prompt in 1917 than in 1916, and the growers were much better pleased. The Australian clip was bought for the same price as that paid in 1916, i. e., 55 per cent advance over the price of 1913–1914. The Imperial Government offered to buy the South African clip on the same terms as the Australian, but there was considerable opposition in South Africa where the matter became a bitter political issue.

The Government had, therefore, by the middle of 1917, extended its control until all branches of the wool trade were under rigid supervision. The principal features of wool control, as established under the reorganization scheme, lasted until the armistice was signed. The military needs had been steadily increasing and the surplus wool stock growing smaller up to the end of hostilities. The shortage of wool for the civilian trade was acute in the summer of 1918, and there was considerable unemployment in the industry.[35] The Government, so much criticized in 1917 for restricting hours of employment in the industry, was vindicated.[36] The reduced amounts of wool which it was possible to assign to civilian needs were insufficient to meet the demands of the trade, and consequently provision was made early in 1918 for standard cloth, flannel, and blankets. The leading feature of 1918 was the great pressure of military needs.[37]

Many firms in Yorkshire, which before the war had never used the home-grown British wools, resorted to their use for military cloths.[38] The output of home-grown wools was somewhat smaller in 1918 than in 1917.[39]

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[31] London Times Trade Supplement, Sept., 1917, p. 132.
[32] British Board of Trade Journal, July 4, 1918.
[33] British Blue Book, Cd. 8447, p. 14.
[34] British Board of Trade Journal, Apr. 4, 1918, p. 401.
[35] London Times Trade Supplement, May and June, 1918.
[36] Ibid., October, 1918.
[37] Textile World Journal (New York City), Jan. 11, 1919, p. 335.
[38] U. S. Commerce Reports, Jan. 16, 1918, p. 200.
[39] Textile World Journal (New York City), Jan. 11, 1919, p. 335.

In November, 1918, as the result of trade conferences called by the war office, a British wool council was formed in place of the board of control, to prepare plans for the gradual relinquishment of control by the Government.[40] This wool council consisted of 41 trade members, 23 of whom were representatives of the employers and 18 representatives of employees. The Government departments were given 12 representatives, but these did not have the right to vote. The board of control, which had charge of clothing the military forces, kept on with its work and equipped each demobilized man with a civilian suit. After this work was finished, it was merged into the wool council.[41]

The representatives of all branches of the wool trade, with the exception of the labor group, urged the speedy relaxation of Government control.[42] This was not an easy matter, however,[43] after the years of Government activity which had intervened since the beginning of the war. It was decided early in 1919, however, that the next British clip would not be purchased.[44]

The London wool auctions began again on April 2, 1919. Feeling in the wool trade during the early months of 1919 was distinctly apprehensive, so that the result of the first series of auctions was a great surprise. The better grades of wool sold for 10 per cent more than the new Government schedule of prices which had been put into effect on April 1. The new schedule of prices effected a reduction of 7½ per cent and this scale was maintained for eight months.[45] At the first auction, good Merinos were as much as 15 per cent higher. "Come back" and fine crossbred brought high prices, some choice Geelong fleeces selling from 78 to 88 cents, which was 15 per cent more than the Government prices. Medium crossbreds did not show as much advance, being about 7½ per cent above Government prices, while coarse qualities were only 5 per cent above schedule prices.[46]

The London wool sales continued and prices rose on all the better grades of wool almost throughout the summer and autumn. There was something of a check to the increase during the middle of the summer owing to labor troubles in the combing department of the industry, and to strikes in the coal fields and on the railways.[47] These circumstances at the opening sale of the fourth series on July 14 caused prices of fine Merinos and crossbreds to show a loss of 5 per cent and prices of inferior qualities a loss of 10 per cent. This drop in prices led to the opening of the next series of sales to neutral

[40] New York Journal of Commerce, Jan. 13, 1919.
[41] U. S. Commerce Reports, Dec. 18, 1918, p. 1057.
[42] Ibid., Sept. 28, 1918, p. 1009.
[43] New York Daily News Record, Jan. 2, 1919.
[44] London Economist, April 5, 1919, p. 589.
[45] Ibid., Mar. 15, 1919, p. 465.
[46] Ibid., April 5, 1919, p. 589.
[47] London Times Trade Supplement, Aug. 16, 1919, p. 589.

countries as well as to the Allies.[48] The amounts which each country could buy were limited and export licenses had to be obtained in the usual way. The transportation difficulties had caused large stocks of wool to pile up in the storehouses and the capacity of the London sales for disposing of stocks was being taxed, and so, beginning in August, wool was sold on description. The use of Hull as a port of importation for wool was also adopted to ease the transportation situation.[49]

The labor trouble in the wool-combing branch of the industry was finally settled by an agreement, which was to remain in force until August, 1920. There was continual pressure on the Government to bring forward more of the high grades of wool, but the Government refused to include in the auction offerings more than the ordinary percentage of such wools. To do so would leave them with a large stock of the undesirable grades—a disaster in the current state of demand, which was for the finer quality of cloth.[50]

The leading feature of the latter part of 1919 and the early months of 1920 was the rise in the price of the fine Merino wools. The prices of medium crossbreds declined, and the lower grades of wool were almost a drug on the market, but the large stocks of fine Australasian wool owned by the British Government sold surprisingly well. The price of Australasian 64s, scoured, in the London market in July, 1914, was $0.57 per pound; the British Government issue price, April 1 to November 30, 1919, was $1.24 to $1.32; while the London auction price, December, 1919, was $2.81.[51] Beginning in May, 1920, prices began to decline. Bradford manufacturers received many cancellations of orders, and dullness marked conditions in the wool and woolen business throughout the summer of 1920.

AUSTRALIA.[52]

During the first two years of the war the wool clip of Australia was marketed in the usual way; that is, principally through auctions held in the leading cities of the Commonwealth. There was a decrease in the exports in 1914–15 on account of the drought, and the falling off in the number of sheep caused an even greater decrease in the exports of 1915–16. During the early weeks of the war the market was depressed, but after the war orders began to be executed there was unprecedented activity. When sales commenced, at the end of October, 1916, crossbred prices advanced 15

[48] U. S. Commerce Reports, Aug. 6, 1919, p. 737.
[49] Standard Daily Trade Service, Oct. 24, 1919, p. 171.
[50] U. S. Commerce Reports, Sept. 25, 1919, p. 1609.
[51] The Market Reporter, U. S. Department of Agriculture, Bureau of Markets, June 5, 1920, p. 367.
[52] The same method was followed by the British Imperial Government in handling the Australian and New Zealand wool clips. Therefore no separate account of the New Zealand purchase is given.

to 20 per cent, while Merinos were 5 to 25 per cent lower.[53] The demand from all the principal allied and neutral markets was very heavy. There was a great expansion of manufacture in the United States, Italy, Japan, and Russia. It was not long before the high range of prices which had been reached in the "boom" year of 1899 was surpassed.[54] There were, however, unusual difficulties, due to the alteration of the channels of trade, the scarcity of shipping, and high insurance and freight rates. Although the season was disastrous for some flockmasters, because of drought losses, this condition did not prevail over the whole country. In West Australia a fairly good season followed a succession of bad seasons.

The leading feature of the season of 1915–16 was the great volume of American purchases. The United States took nearly one-third of the exports of wool from Australia in that year—the largest proportion which it had ever taken. The wool was shipped to the United States under agreement with the Textile Alliance, which guaranteed that none of the wool, and no wool tops or yarn made therefrom, would be exported.

The amount of Australian wool taken by the United Kingdom in 1915–16 was 742,178 bales, or 41 per cent of the total sales. There was difficulty in securing enough tonnage to ship the wool and there was congestion at the docks when it arrived, besides difficulties in unloading and transporting it to the manufacturing centers. The obstacles were all surmounted, however, and the wool was needed to fill the great demand. The price seemed likely to fall at one time during 1916 on account of the surplus which had accumulated in England, but the unusual American demand and an increased demand from Italy and Japan prevented.

The British Government arranged, in November, 1916, to take over the entire Australian clip.[55] The outstanding feature of the plan was that it utilized all the existing agencies of trade to the fullest degree. The work was apportioned among the members of the trade practically on the basis of the amount of business handled in prewar times. The Commonwealth of Australia Central Wool Committee was the body which assumed the responsibility for carrying out the purchase scheme. This committee was assisted by State committees (one in each State of the Commonwealth) elected by the State wool trade, in conference, and was constituted much like the Central Committee.[56] In addition to these committees an advisory committee of wool experts was appointed to assist the central administration in technical matters.

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[53] London Economist, War Supplement, Dec. 19, 1914, pp. 34–36.
[54] Ibid.
[55] British Blue Book, Cd. 7896 (Australia).
[56] Central Wool Committee of Australia, Bulletin No. 1, 1917–18, p. 70.

The manner in which the work was actually carried out was as follows: The Central Wool Committee, at the beginning of each season, ascertained from statistics gathered from all parts of Australia the probable size and quality of the next clip, and on the basis of these figures made up a program of appraisements for each of the various States. This program, or roster, of apportionments set forth the number of bales for each center, the date when the assembling of bales should commence, and the time allowed for the work. On receiving this program, the committee in each State allotted to each wool-selling broker the number of bales he would be allowed to include in his catalogue. When the wool had been received by the wool-selling brokers and had been catalogued, the growers being given preference according to the date of shearing and of arrival in storehouse, the wool was prepared for the appraisers. Nearly 300,000 separate valuations were made during the 1916–17 season.[57]

For the valuation of the wool, two sets of sworn appraisers were appointed, one to represent the Government and the other the wool-selling houses. The latter were supposed also to represent the growers, since the grower could send his wool to any selling house he chose. The appraisers were paid salaries in 1917–18, and were not allowed to receive any commission or brokerage fee from any source whatever. Commissions paid the previous year amounted in some cases to extraordinarily large sums.[58]

The committee of wool experts, assisting the Central Wool Committee, including British, Australian, French, American, Italian, and Japanese assistants, produced what was known as the "Basis of Clean Cost Price" or "The Table of Limits."[59] This table classified the wool grown in Australia into 848 types, with a price range from $0.20 to $1.52 per pound. This table superseded the 1916–17 "Clean cost basis of prices," which consisted of 381 types. Computation was made of the value of the wool of each different percentage of shrinkage, of each particular type, on the assumption of an average price for the whole clip of $0.31 per pound.

From November 22, 1916, to May 24, 1919, the Central Committee paid out approximately $506,112,000 for 4,917,324 bales.[60] The Commonwealth Bank of Australia was the financial agent for the Central Wool Committee and directed the arrangement for the transfer of money from London and for payment to the wool brokers and growers.[61]

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[57] National Wool Grower, Salt Lake City, Utah, Oct., 1917, pp. 11–12 (Harrowell).
[58] Sydney, New South Wales, Journal of Commerce, Aug. 12, 1919, pp. 220–222.
[59] Central Wool Committee, Bulletin No. 1, 1917–18.
[60] Sydney, New South Wales, Journal of Commerce, Aug. 12, 1919, pp. 220–222.
[61] Special Report on the Livestock and Meat Industry of Australia made to the Bureau of Markets, United States Department of Agriculture, by Mr. Moomaw, on Oct. 11, 1918.

The wool to be sent abroad, which comprised the greater portion of the clip, was put in charge of the shipping house by the wool-selling broker. The shipping houses assumed the particular functions which they performed in prewar times, including storage of wool pending shipment, the preparation of invoices, making out of bills of lading, and moving wool from storehouse to ship. A firm appointed by the Central Wool Committee acted as a clearing house and had the duty of checking all documents connected with appraisement, shipment, and other disposal of the wool. The wool to be shipped was apportioned among the different markets by the controlling appraisers, who were assisted by a highly trained staff composed of men who knew minutely the requirements of each different division of the manufacturing business.

It has been impossible to give all the multitudinous details which [illegible] by the Central Wool Committee, but enough of these have been mentioned to show the extent and importance of their [illegible]. The simplification of official documents was one of the [illegible] features of the scheme. This meant a considerable [illegible] in the efficiency of the wool trade.

The [illegible] of the Central Wool Committee give, for the [illegible] information concerning all the various [illegible] of Merino and crossbred wool produced in [illegible].

[illegible] wool trade retained its identity and no branch of [illegible] was forced to undergo hardships, as the result of the [illegible]. The plan was so successful that there was [illegible] its extension beyond the 1st of July, 1920, the date [illegible]. A referendum to the woolgrowers for [illegible] showed a minority in favor and [illegible] was dropped.

[illegible] and the training in organization which the [illegible] can hardly fail to be of value in the future. [illegible] placed on the market has been urged by [illegible] and it is likely that the war experience [illegible] in a better position to carry out such a [illegible].

BRITISH SOUTH AFRICA.

The wool trade of British South Africa was in a stagnant condition [illegible] of the war in 1914, in common with most of [illegible] of that country.[62] Most of the wool from South [illegible] the United Kingdom before the war, but only about [illegible] the exports of wool was retained there.[63] Germany

[illegible] New Times, South Africa, Jan. 19, 1915.

[illegible] Review of Reviews, Mar.–Dec., 1917, pp. 469–471.

used over one-third of the exports of South African wool. For the three years, 1910–1912, Germany imported annually, on an average, 52,000,000 pounds of wool from that country.[64] The total exports of wool from the Union in 1913 were 176,972,000 pounds, which was the largest they had ever been.

The clips of 1913–14 and 1914–15 were about normal and, as the trade was very dull, stocks were piling up at Cape Town, Port Elizabeth, East London, and Durban. Before the war there had been very little wool shipped direct from South Africa to the United States. The value of wool exported direct to America in 1912–13 from South Africa was $40,753.[65] In the latter part of October, 1914, inquiries were received in South Africa from prospective purchasers in the United States, and two or three American buyers arrived in South Africa at about the same time. These men began making purchases and the market became considerably stronger about the first of the year 1915. During the latter part of 1914, the British Government had prohibited the shipment of wool from South Africa to any but British ports, and this added to the stagnation of the trade. About the first of January, 1915, the ban was removed.[66]

During the year 1915 the exports of wool from the Union of South Africa were 170,003,173 pounds (valued at $26,181,921), which was a larger amount than for any other year, with the exception of 1913. The United States took the place of Germany as the purchaser of next importance to the United Kingdom.[67]

The direct shipments of wool from South Africa to the United States continued to increase during the next year, and Japan began to come into the South African market as a large buyer. The total exports of all kinds from South Africa to Japan in 1913 were valued at $21,000; in 1916, at $84,000; and in 1917, at $13,830,773, the greater part of which consisted of wool.[68] Japan bought its wool principally from Australia before the British Imperial Government purchased the Australian clip in November, 1916. After that time Japan commenced to buy heavily in the South African market.[69]

The British Imperial Government offered, on May 24, 1917, to purchase the South African clip on the same basis that it had purchased the Australian clip (an average of 55 per cent increase over the prices prevailing during the year preceding the war). The British and allied military demands were steadily increasing and the Imperial Government was anxious to build up reserves of wool in the

[64] Bulletin Imperial Institute (London), No. 4, Vol. XVI, p. 488.
[65] U. S. Commerce and Navigation Report, 1913, pp. 295–296.
[66] U. S. Commerce Reports, June 22, 1915.
[67] Ibid., July 21, 1916.
[68] Ibid., Supplement 66–a, Feb. 28, 1919 ,p. 22.
[69] London Financial Review of Reviews, Mar.–Dec., 1917, pp. 469–471.

United Kingdom. Shipping facilities were becoming increasingly inadequate, with the result that large amounts of wool would have to remain in South Africa. Priority of shipment would have to be allowed for wool required for Government purposes, and consequently the offer meant avoidance of risk by the growers.[70]

A conference was held at Pretoria on July 27, 1917, for the purpose of considering the offer of the Imperial Government. This assembly consisted of 88 delegates from all parts of the Union, all of whom were actually engaged in the wool trade or in sheep farming. The consensus of opinion of this conference was that the price offered by the British Government was considerably lower than that prevailing in the South African market, and it was considered that they should ask the Imperial Government to raise the price, using as a basis of the 55 per cent increase, not the price prevailing during the year preceding the war, but the rate of 20 cents per pound in the grease for 40 per cent supercombing wool.[71] The dissatisfaction with the use of the price of 1913–14 as a basis was due to the fact that there had been a drought in South Africa in 1913–14, which had affected adversely the quality of the clip and reduced the average price per pound. The high prices in the South African market were due largely to the very active operation of the Japanese buyers.[72] The Pretoria conference finally decided to leave the matter in the hands of the Union Government to make the most advantageous arrangement possible.[73]

There was some dispute over the question as to whether the Imperial Government should purchase such part of the clip as the growers were willing to offer, or whether the whole new clip should be included. Finally, the British Government agreed, on October 2, 1917, to accept all the wool that should be voluntarily offered within a certain period. They refused, however, to purchase the South African wool on the price basis suggested, insisting on that which had been arranged in the case of Australia and New Zealand. On October 6, 1917, the Union Government confirmed the acceptance of these terms and stated that measures were being taken to ascertain the amount of wool which the South African growers wished to sell to the Imperial Government.[74]

The matter was given publicity in the South African press, and administrative details were arranged. The time allowed for registration of wool for sale to the Government closed on October 31, 1917, and on that date there had been registered 190,669 bales, about one-

[70] Union of South Africa, Dept. of Agric., Report by Central Wool Committee on Government Purchase of Wool and Sheepskins, up to July 31, 1918, p. 4.
[71] Ibid.
[72] The Wool Record, Bradford, England, Jan. 17, 1918, p. 77.
[73] Union of South Africa, Central Wool Committee Bulletin, July 31, 1918.
[74] The Wool Record, Bradford, England, Jan. 17, 1918, p. 7.

third of the season's production. Appraising centers were established, and the actual purchase of the clip began.[75]

There had been a great deal of discussion of the question in the South African press. The principal issue was whether the South African growers should take the assured price, as offered by the Imperial Government, or whether they should assume a certain amount of risk, in the hope that the shipping situation would be favorable and that Japanese and American buying would continue heavy. The existing uncertainty led a good many growers to register their clips with the Government, but when they found that Japanese and American competition continued strong, and that wool prices were likely to go even higher, there was a great deal of dissatisfaction.

The matter became a party issue. The South African Party (the party in power at that time) was favorable to the scheme while the Nationalist Party opposed it. Some of the dissatisfied growers ignored their registrations and took advantage of the open market, while others appealed to the Union Government to release them from their obligations. Accordingly, the Union Government addressed the Imperial Government on the 6th of January, 1918, explaining the situation and asking whether the British Government would be prepared to release from their agreement the owners of wool who might desire to be released. The reply was in the affirmative. The Imperial Government stated that the difficulty of providing freight to England had increased, while more freight for Japan and the United States had been forthcoming. The demand for South African wool in those countries had been greater than anticipated, and, consequently, they were willing to release the growers.

The Union Government, on the 15th of January, 1918, informed participants in the Government scheme that they were at liberty to retire from their contracts if they desired, provided they did so within 14 days from the above date. The quantity of wool withdrawn amounted to 59,597 bales.

The release of the growers by the Imperial Government was hailed as a victory by both the South African and the Nationalist Parties—by the former, on the ground that it proved that the Imperial Government had no desire to "cheat" the growers, and by the latter on the ground that the release was due to their agitation. The Union Government canceled export licenses for wool sold to Japan, on January 29, 1918, the last day of the period allowed for withdrawal of woolgrowers from the Government purchase scheme. This caused a slump in price of 25 per cent on some grades and considerable irritation resulted from the ruling. The reason assigned for the cancellation was that Japanese merchants might resell to Russia.[76]

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[75] Union of South Africa, Central Wool Committee Bulletin, July 31, 1918, p. 8.
[76] Report of American consulate general of Cape Town, South Africa, Feb. 1, 1918.

The minister of agriculture of South Africa said in the Assembly that the average price paid by the Government for the wool registered was 13.35 pence (approximately 27 cents) per grease pound. The average price of the wool sold in the open market and shipped August 1, 1917, and March 31, 1918, was 17.89 pence (approximately 36 cents) per grease pound.[77]

When it was made public, in January, 1918, that the Imperial Government would release from their agreement those participants in the Government scheme who were dissatisfied, the Japanese reduced their buying. American buying was also reduced very much in 1918. During the summer the United States War Trade Board announced that all licenses for the importation of wool from South Africa to the United States would be canceled for shipments made after July 28. There was great activity at Port Elizabeth during the few days preceding the 28th of July; five ships, carrying 3,931,450 pounds of wool, valued at $2,704,466, sailed from that port for the United States about that date.[78]

The Union Government favored imperial purchase of the wool clip of 1918–19, but there was not a satisfactory response by the growers and the Imperial Government did not make another offer.

There was a shortage of shipping during the ensuing year, and large stocks of wool accumulated in South Africa. Just how large these were it is impossible to say, but the surplus from the 1917 season was estimated at 70,000 bales of 350 pounds each (24,500,000 pounds). There was also a large surplus from the 1918 season. South Africa's exports of wool decreased from 177,000,000 pounds in 1913 to 116,000,000 pounds in 1918, while the value increased from $27,739,050 to $47,205,050.[79]

The United States vice consul estimated that the stocks on hand in South Africa on April 30, 1919, were about 250,000 bales, or about one-half the average yearly output.[80] By August 23, 1920, this had been reduced to 130,000 bales.[81]

The Central Wool Committee, which had charge of the imperial purchase of wool, carried out several reforms in the preparation and marketing of wool which should improve the methods employed in the future. The committee also strongly urged the formation of a South African Wool Growers' Association to assist in carrying out these plans. The fact that these matters have been agitated indicates, as a result of the war experience, a greater interest in growing a good grade of wool.[82]

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[77] The Cape Argus, South Africa, May 3, 1918, quoted from De Volkstem.
[78] U. S. Commerce Reports, Sept. 23, 1918.
[79] African World, London, July 26, 1919.
[80] Vice Consul Heisler, Cape Town, Apr. 30, 1919.
[81] U. S. Commerce Reports, Sept. 7, 1920, p. 1124.
[82] American Sheep Breeder and Wool Grower, Chicago, Feb., 1916, p. 103.

Reports from South Africa are to the effect that the war has considerably stimulated woolgrowing, and that the tendency, which will probably be permanent, is toward improvement of the product and expansion of the industry.

SOUTH AMERICA.

The effect of the control of wool exercised by other countries is the most important phase of the South American situation. South America, and particularly Argentina, the leading wool-growing country of that continent, was the principal open wool market during the war. Before the war most of the wool from Argentina went to Continental Europe and the United Kingdom. In 1913–14, out of a total exportation of 405,888 bales (of about 950 pounds each), 314,494, or 77.5 per cent, went to the Continent of Europe—France, Germany, and Belgium being the leading customers. A considerable amount of this wool was scoured in those countries and reexported in clean condition. Of the remaining 90,000 bales, the United States and the United Kingdom each took about one-half.[83] The effect of the war was to prevent shipment of wool to Germany, but it did not prevent purchase of wool in the Argentine market on German account. It has been estimated that 40,000 bales were thus taken during the early part of the war.[84] Germany was the leading purchaser of Argentine wool in 1914, but in 1915 the United States took the largest amount, and in 1916 more than one-half of the wool of the country came to the United States. The average price of wool in Argentina in 1912 was 15.4 cents (United States gold) per pound; in 1913, 16.5 cents per pound; 1914, 17.5 cents; and in 1915, 20.1 cents per pound.[85] During the latter part of the war prices rose much more rapidly. The average price jumped to 29 cents per pound in 1916. In October, 1916, good crossbred wool sold for 40.4 cents per pound. Large quantities sold for 50 and 60 cents per pound during 1917 and the early part of 1918.[86]

The demand for wool was so great that large amounts were bought before shearing time. This is not an uncommon practice in Argentina, and it was employed more than usual during the war. It was estimated that 5,500,000 pounds of wool had been sold on the sheep's back up to September 9, 1916. The Argentine wool season runs from October 1 to September 30, but purchase on the sheep's back sometimes begins as early as August. During the latter part of 1916 the competition between German and American buyers had

[83] Dalgety's Annual Wool Review, Australia, 1915–16, p. 63.
[84] Textile World Record, Boston, Mar. 14, 1918, p. 369.
[85] U. S. Commerce Reports, Dec. 1, 1916, p. 825.
[86] U. S. Commerce Department, Latin American Div. Circular, Jan. 5, 1918.

become so keen that it seemed almost as if price were not an important factor.[87] The tendency for buyers to seek the high-grade wools was very noticeable, and large quantities of inferior wools were left on the floor of the central market in Buenos Aires long before the season of 1916–17 closed. The reason for this was that the principal prewar purchasers of the inferior wools, namely, France, Belgium, and Germany, had greatly curtailed their buying.

The control of prices in the South American market was of great importance to Great Britain and the United States, the principal purchasers, and not long after the United States entered the war the Government announced that it might exercise an option to take all wool imported from South America to this country at a fixed price. This caused a decline in the South American prices, and after the United States Government exercised its option on March 1, 1918, the price in the South American market again fell.

During the latter part of 1918, and during 1919 also, the stocks of wool accumulated quite rapidly. Various estimates placed the amount on hand in Argentina in May, 1919, at from 100,000,000 pounds to 275,000,000 pounds. This stock had not been decreased by August 21, 1920. At that date the American consul at Buenos Aires placed the holdings at the larger figure.[88] The lack of shipping to move the wool and the strikes of railway workers and dock hands tended to aggravate the difficulty.[89]

One of the most important war developments in the Argentine was the export tax on wool. This tax was promulgated by the Government on January 19, 1918.[90] It was adopted to supply the deficiency in revenue which came about by reason of lessened receipts from import duties. Certain basic prices for the different commodities were fixed in the law, and the tax was levied on the difference between the basic price and the appraised price of the exported commodity. The tax was 12 per cent of the difference between these two prices for direct agricultural products and 15 per cent for other products. The basic price of unwashed wool exported from the Provinces of Entre Rios and Corrientes was $600.60 (gold) per 1,000 kilos. The appraised price (which is changed from time to time) was $1,489.48 and the duty $133.33 per 1,000 kilos ($0.06 per pound). Different basic and appraised prices are fixed for the other Provinces and Territories of the country.[91]

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[87] The Wool Record, Bradford, England, Jan. 8, 1918, pp. 7–8.

[88] U. S. Commerce Reports, Sept. 7, 1920, p. 1124.

[89] River Plate Review, Buenos Aires, Argentina, June 13, 1919.

[90] Dalgety, op. cit., 1914–15, p. 53.

[91] The export tax was as follows for Aug. and Sept., 1920: On unwashed wool from the Provinces of Entre Rios and Corrientes, $0.022 (gold) per pound; on unwashed wool from the Provinces of Buenos Aires, Santa Cruz, and Terra del Fuego, $0.0088 (gold) per pound; on unwashed wool from the Provinces of Santa Fe, Cordoba, La Pampa, Rio Negro, and Chubut, $0.01 (gold) per pound; on unwashed wool from the Provinces of Mendoza, San Luis, etc., $0.011 (gold) per pound.—The River Plate Review, Aug. 6, 1920.

Uruguay, as well as Argentina, has adopted an export duty on wool. This was promulgated by the law of November 9, 1917. The export duty amounted to 4 per cent of the value of the wool, the value being fixed by decree from time to time.[92] Combed wool (tops) was not made subject to the export duty and was therefore subject only to the general surtax ("patent adicional") of 1 per cent and a small statistical tax.

During 1912–13 (the wool year in Uruguay extends from October 1 to September 30, as in Argentina), the exports from Uruguay were 122,167 bales (of 950 pounds each), most of which went to the Continent of Europe. The principal ports to which it was shipped were Dunkirk, Hamburg, Antwerp, Bremen, Genoa, Trieste, and Le Havre.[93] The United States took very little Uruguayan wool and the United Kingdom only slightly more than 10 per cent of the clip. In 1913–14 exports were 100,282 bales, and the destinations were about the same, except that the United States took 10,522 bales and the United Kingdom only a slight amount of the wool. During the next three years the exports fell off a great deal. Genoa took about 45,000 bales in 1914–15, which was more than one-half the export, and presumably a large part of this was reshipped to Germany. In 1915–16 the exports reached the low point of 44,368 bales, about one-half of which went to Genoa. In 1916–17 the exports were 63,134 bales, of which the United States took over 46,000 bales.[94] During the calendar year 1919 even this figure was slightly exceeded, so that the United States may be considered Uruguay's best customer.

The exports of wool from Uruguay do not exactly represent Uruguayan production, as several million pounds are sent from southern Brazil to Montevideo each year, and several thousand bales are sent from parts of Uruguay to Buenos Aires for export.[95]

A national wool exposition was held in Montevideo in February, 1918, and the Government has been showing considerable interest in the improvement of the wool produced in the country.[96]

The principal interest attaching to the subject of wool growing in Brazil lies in the Government's efforts to promote the industry. The leading sheep-raising Provinces of Brazil are Sao Paulo, Rio Grande do Sul, and Minas Geraes, where there are great plains at a high elevation and with excellent pasturage for sheep. The wool output of Brazil has averaged about 35,000,000 pounds annually of late

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[92] The official valuations for the year 1920–21, for the assessment of export duties were: Raw and pulled wool, 80 pesos per 100 kilos ($0.376 per pound); washed wool, 105 pesos per 100 kilos ($0.493 per pound). The tax remained at 4 per cent. That on the former kinds was therefore $0.015 per pound and on the latter kind, $0.02 per pound. U. S. Commerce Reports, Aug. 26, 1920.

[93] Dalgety: op. cit., 1917–18, p. 51.

[94] Ibid.

[95] U. S. Commerce Department, Circular of Latin American Div., Dec. 22, 1917.

[96] U. S. Commerce Reports, Nov. 14, 1917, p. 612.

years, but only about 4,000,000 pounds are exported, in addition to the amounts which find their way to Montevideo.[97]

Until the European war, most of the Brazilian wool exports went to Belgium. During 1915, the exports, which were less than one-half those of former years, were divided almost equally among Argentina, Uruguay, and the United States.

The number of sheep in Brazil in 1912, according to the estimate of the Minister of Agriculture, was 10,480,570. This number was reduced in 1916 to 7,204,920, of which about 4,000,000 were in the State of Rio Grande do Sul. The most favored breeds imported for crossing are the Rambouillet, Lincoln, Romney Marsh, Shropshire, and Southdown. The last named is the favorite in Rio Grande do Sul, the leading sheep-raising State.

The President of Brazil, in a decree of February 27, 1918, stated that additional sheep were needed to meet the demands of the meat-consuming markets, and that more wool was necessary to supply the growing textile manufacturing industry. He stated that the flocks of sheep were diminishing and that the demands for exportation of mutton might further deplete the supplies. In view of this situation, the Federal Government decided to assist the several States and municipalities and the agricultural societies:[98]

(1) The Government is to pay one-third the cost, plus freight, of sheep and goats imported from foreign countries for breeding purposes, not to exceed 25 head of each sex for each breeder.

(2) To pay the sum of 15 milreis (about $3.75 American currency) for each animal imported into the country, and for transportation within the country of crossbred sheep up to 1,000 head.

(3) The number of animals exceeding that mentioned in paragraph (1) will be entitled to the privileges of paragraph (2) up to 1,000 head.

In order to obtain these favors from the Government, breeders shall be obliged to prove: (1) That they possess at least one hectare of land for every four animals; (2) that the lands are dry and of a silica-argil kind; (3) that the pastures are cleared and contain no thorny plants which might injure the crop of wool; (4) that an abundance of suitable fodder is available; (5) that pure running water also is available for the animals; (6) that the climate in the particular locality is dry and temperate; (7) that the breeders possess corrals, have ample facilities for dipping sheep, and for clipping the crop; (8) that the sanitary laws are observed in importations under this decree, the minimum age limit of imported animals being 1½ years and the maximum 3 years.

THE UNITED STATES.

The history of wool in the United States since the beginning of the war may be divided, for purposes of present consideration, into three periods. During the first period, from 1914 until our decla-

[97] Bulletin Imperial Institute, London, Vol. XVI, No. 4, p. 483.

[98] U. S. Commerce Reports, Apr. 9, 1918, p. 116; also American Sheep Breeder and Wool Grower, Chicago, May, 1918, p. 320.

ration of war, there were no special Government regulations. The wool manufacturing industry enjoyed a period of great activity. Imports of wool rose to unprecedented amounts, yet domestic wool-growing was aided by rising prices. In the course of the second period, from April, 1917, until November, 1918, wool passed gradually under Government control, until, at the end of the period, all phases of the business were strictly regulated. The third period, after the signing of the armistice, was the period of "decontrol." During the last period the great problem was the stabilization of the industry, and (from the point of view of growers and of the Government which owned large stocks) the reestablishment of the world market for wool without too sudden a break in prices.

First Period.

The tendency of wool prices was slightly downward in 1913, after the removal of the duty on wool, which was effective on December 1. Most of the decrease had been discounted, however, during the months preceding the passage of the act. The price recovered early in 1914 and soon after the outbreak of the war in Europe showed a marked upward tendency.

It has been estimated that the number of sheep on the ranges of the far West decreased by 4,500,000 from 1910 to 1914, principally because of the settlement of the land, 85,000,000 acres of which were "taken up" during that time.[99] The increase in the prices of wool and mutton did not have the effect which might have been expected. There were fewer sheep in the country in 1918 than on January 1, 1914.[100] It might be surmised that the decrease was caused by more slaughtering, owing to the high price of mutton, but, as a matter of fact, the number of sheep slaughtered did not increase.[101]

The American woolen mills were fairly active during the early part of 1914, but the year, as a whole, was one of rather slack business in the industry. One-third of the total machinery in the country was idle on December 1, 1914. Toward the end of the year the receipt of orders for military fabrics from the European Governments caused a revival of the industry.

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[99] Uncertainty as to future conditions, difficulty in securing money for purchase of breeding stock, increase in value of land and dairy products, improvement in grade and weight of animals at the expense of numbers, drought and severe winters, and range deterioration have had some effect in bringing about the decrease during a part of the period, but considering the period as a whole they had only a small influence in the aggregate.—Live Stock Production in the Eleven Far Western States, U. S. Department of Agriculture Bulletin, by W. C. Barnes and Jas T. Jardine:

[100] 49,802,281 in 1913; 48,983,281 in 1918.—Bulletins of the Nat'l Assoc. Wool Mfrs.

[101] Number of sheep slaughtered under Federal inspection: 14,958,834 in 1913; 11,343,-418 in 1917. It should be noted, however, that the decrease in slaughtering in 1917 was partly due to a small lamb crop.—Yearbook, U. S. Dept. of Agriculture, 1917, p. 746.

The British embargo on the exportation of wool from the United Kingdom, which was put in force in October and was extended to wools of the Colonies in November, was modified in January, 1915, so that it did not greatly affect importations of wool into this country.

There were large reexports of foreign wools and tops from this country to the United Kingdom in the autumn of 1914, and, in December, shipment of domestic wool to Germany began, which led to the prohibition of the exportation of British colonial wools to this country until after the Textile Alliance had been formed. The alliance guaranteed that such wools, whether in the raw state or as tops or yarn, would not be exported.

The year 1915 was one of increasing activity. Wool prices remained firm and the increasing difficulty of securing foreign wools placed the domestic woolgrowers in a more and more favorable position. As it became apparent that the war was likely to be protracted, the civilian trade began to compete with the military needs, and, as the export trade also began to assume importance, optimism in all branches became pronounced.

In some ways the tide of the war prosperity reached its climax in 1916. From July 1, 1915, to June 30, 1916, importation of wools reached more than 500,000,000 pounds, a large part coming from Australia.[102] The domestic production was about 300,000,000 pounds as usual, so that the domestic consumption was far in excess of any prewar consumption. During the latter part of 1916, the embargo, which had been intermittently enforced by the British Government, again became effective and imports decreased. In November, 1916, the British Government took over the entire Australasian clip, and thereafter it was very hard for American buyers to get colonial wools.

Despite the general upward tendency of the market, the contracting of "territory wools" took place as usual. In February, 1916, contracts of moderate volume were made and the prices paid were about the same as at the opening of the 1915 season—21 to 22 cents for "fine" and 24 to 25 cents for "medium." Most of the early contracts were made in southern Utah.[103] Wool prices continued to advance through the year and $1 a pound for scoured wool was reached, the highest price realized since the Civil War.[104]

Fleece wools constantly advanced in price. Delaine wools were especially strong, principally because of the fact that choice combing Merinos from Australia were scarce, owing to the embargo, and also because of the relative scarcity of staple wool in the territory clip.

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[102] American buyers purchased about 3 per cent of the Australian wool in normal years before the war, 15 per cent in 1914–15, and 31 per cent of the entire Australian clip during the season of 1915–16.—Dalgety · op. cit., 1916–17.

[103] Textile World Journal, New York City, Jan. 13, 1917, p. 227.

[104] Ibid., p. 228.

Buyers who would ordinarily have used the best 64s and 70s combing Australia wool turned their attention to Ohio wools of the better classes.

For the first time on record the price per pound of sheep and lamb on the hoof passed that of beef cattle.[105] The prosperity of the industry made it possible to give attention to details which had been previously neglected. A contemporary reviewer said, "Growers are paying more and more attention to problems of breeding and the care of their flocks and the improvement and packing of their clips. Thoroughly carried out, these can not but help to put American flock masters in a better position to meet the inevitable foreign competition, after the war, than they were before."[106]

Second Period.

When the United States declared war, the Boston wool trade offered the entire available supply to the Government at the prices of April 2. For 10 days in the early part of April, 1917, trading was at a standstill in the Boston market. The stocks on hand in Boston warehouses amounted to 62,934,639 pounds of grease wool, domestic and imported. The Government was not in a position to accept the offer at that time and speculation continued, with rising prices, after its rejection.

A great effort was made during 1917 to get the British Government to liberate colonial wool for the American market, but with little success. It was announced on January 16, 1917, that the British Government would allot 50,000 bales to the United States, but this wool was not received until the very end of the year. When it was received, auctions were held in Boston—a decided innovation. The best of this wool sold as high as $1.98 per scoured pound, good Geelong and Melbourne wools (combing) rose to $1.88–$1.95, and new wool price records were established.[107]

The London sales were open to American buyers on March 29 and 31, 1917, to test the strength of American demand, but at that time not very much wool was bought on account of the high prices, and the sales stopped altogether.

The Navy Department announced in July, 1917, that it would purchase wool. Although the amount was small, only about 2,000,000

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[105] The tendency toward raising sheep producing mutton as well as wool continues, and is an important feature in our wool industry, for although the merino sheep can not be dispensed with as the foundation of our flocks, and its pure fleece is of the utmost value for many purposes, yet the constantly increasing demand for sheep meat, and for the medium and coarser wools for manufacture, adds greatly to the income of the sheep raiser, and affords encouragement to the belief in the eventual establishment in the United States of a sheep industry adequate to supply our needs for that kind of food, and for a wool supply sufficient for the clothing of our people, thus rendering us so far independent of foreign sources.—Nat'l Assoc. Wool Mfrs., Boston, Jan., 1919, p. 10.

[106] Textile World Journal, New York City, Jan. 13, 1917, p. 229.

[107] Ibid., Jan. 12, 1918, p. 291.

pounds being bought, this was a radical departure. The wool was allotted to manufacturers working on Navy contracts.

The leaders of the trade felt that something must be done to prevent a "runaway" market, and at a meeting of the Boston trade on July 30, 1917, it was decided to offer to the Government 50 per cent of the unsold wool which was then in Boston or due to arrive, on the basis of the prices prevailing during the week preceding July 30. The traders in other wool markets of the country agreed to the plan. The Council of National Defence approved of the War Department's plan of buying direct, as the Navy had done, and the offer was officially accepted on the 5th of August, 1917.

An advisory committee of the Council of National Defence was formed to assist in the purchase. The War Department bought several million pounds, but this form of purchase was suspended when the War Trade Board and the War Industries Board were formed.

It was announced on December 14, 1917, that on and after December 15, applicants for licenses to import wool must sign agreements limiting the resale of the wool and giving the Government a 10-day option on its purchase. The option price was to be 5 per cent less than the price of July 30, 1917, as established by the valuation committee of the Boston Wool Trade Association. Licenses were also to be required for the exportation of wool and woolens and it was announced that nothing could be exported which was needed for war purposes. This action was taken under the "trading with the enemy act."[108] The announcement that the Government would take an option on all imported wools at the July 30 prices (less 5 per cent) led to extensive cancellation of orders to buy in the South American and Cape markets.

The wool which had been bought was allotted to Government contractors during February, March, and April, 1918. Early in April, 1918, it became apparent that the War Department would have to place orders which would require the use of somewhat over 100,000,000 pounds of scoured wool before January 1, 1919. Investigation disclosed the fact that the stocks in the hands of dealers and importers of wool amounted to only one-third of the necessary amount. It was felt that if these orders were given out with the wool market in a depleted condition the price would soar still higher and great speculation in the domestic clip, which was about to be sheared, would begin.[109]

The Boston Wool Trade was asked to cease operations, to inventory their wool stocks and give the Government an option on the entire amount, whether "spot" or "afloat." On April 5, 1918, Mr. A. W.

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[108] "An act to define, regulate, and punish trading with the enemy and for other purposes." Act of Oct. 6, 1917, Chap. 106, 40 Stat. L., 411.

[109] Elliott, A. W.: History of Wool Top and Yarn Subdivision (Clothing and Equipage, Quartermaster Corps), p. 1.

Elliott secured such an option from the trade. When inventories were taken, it was found that this stock amounted to only about 35,000,000 pounds of scoured wool, an entirely insufficient quantity.[110]

The Price Fixing Committee of the War Industries Board fixed the price of both the optioned wool and the 1918 domestic clip on the basis of prices prevailing on July 30, 1917. It was arranged that the wool should come forward through the regular channels, on consignment to the usual dealers in domestic wools.

This plan made necessary the creation of an adequate agency to administer it and the wool, top, and yarn subdivision of the Quartermaster Corps was established. This body received information in regard to the Army equipment programs for woolen goods and was required to provide the wool necessary to carry them forward. It was also expected to provide the wool necessary for the Navy, Marine Corps, and other governmental departments. The wool administrator purchased the wools, the wool distributor allocated them to manufacturers, and the wool-purchasing quartermaster paid for them. All of these officials were under the direction of the wool, top, and yarn subdivision. That body also superintended the Government purchase of wool in South America and from the British Government.

It was necessary for the Government to secure wool abroad and after the Government option on imports had been exercised and American purchases in the South American market had ceased, having thus curtailed speculation, a wool-purchasing syndicate was created. This consisted of six large importers of South American wools. These firms pooled their resources and buying facilities for the benefit of the Government, buying and importing wool for a commission of 1 per cent. This plan aroused a great deal of criticism, however, because it was impracticable to include all importers, and after it had operated for about six weeks the South American Wool Buying Commission was created to succeed it. This commission represented the Government directly. It arrived at Buenos Aires about October 30, 1918, and operated only a few days. The Quartermaster Corps purchased 200,000 bales of Australian wool at the British issue price.[111]

After it had been definitely settled just what the Government would do, the wool trade again became more active and consignments from growers were solicited. The system established by the Government continued until one week after the armistice was signed.[112] After November 18, 1918, civilian manufacturers were

[110] Elliott: Op. cit., p. 2.

[111] Textile World Journal, New York City, Jan. 11, 1919, p. 231.

[112] "The War Industries Board has fixed the prices of the 1918 clip of wool as established by valuation committees and approved by the Government as those established on July 30, 1917, at Atlantic seaboard markets. These values are figures on scoured basis. A very large portion of the wool-manufacturing machinery working on Government contracts is located close to the Atlantic seaboard, and in order to avoid the possibility

allowed to buy wool from dealers and growers.[113] When the armistice was signed allotments for civilian purposes had long since ceased.

After the armistice was signed there was considerable agitation over the question whether the Government would take all of the 1918 clip. About the middle of December it was announced that the Government would take all domestic wool of the 1918 clip presented for valuation up to March 1, 1919.[114]

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of railroad delay and congestion late in the season when the crops are moving, it is desirable and necessary that the wool clip shall be collected as soon as possible at points near to the manufacturing centers. For these reasons it has been considered advisable to designate as distributing centers those centers which are close to points of consumption and which have the necessary facilities for handling wool.

Therefore all the wool of the 1918 clip must be distributed through approved dealers in approved centers of distribution.

Approved distributing centers are the usual well recognized points of distribution.

Compensation of grower and dealer.—Approved dealers shall be entitled to a gross profit in no case to exceed 1½ cents per pound on the total season's business, this profit to cover all expenses from grower to loading wool on board cars."—Extracts from Government Regulations for Handling Wool Clip of 1918, as established by Wool Division, War Industries Board, Washington, D. C., May 21, 1918.

[113] Ibid., p. 329.

[114] The grower shall receive fair prices for his wool, based on the Atlantic seaboard price as established on July 30, 1917, less the profit to the dealer, as stated above, and less freight to seaboard, moisture shrinkage, and interest.

Growers who desire to do so will be allowed to pool their clips in quantities of not less than minimum carloads of 16,000 pounds and consign the wools so pooled as one account to any approved dealer in any approved distributing center. Growers are urged to adopt this latter course through county agents or others, thus eliminating the profits of one middleman.

Government price.

Approved dealers in approved distributing centers will be required to open and grade all their purchases or consignments as rapidly as possible after the arrival of wool at point of distribution. Prices on all wools, as soon as graded, will be fixed by a Government valuation committee appointed for that purpose in the different distributing centers. Prices to be paid by the Government at distributing centers for such wool as it may require are to be those established as of July 30, 1917, at the Atlantic seaboard markets. In addition to said prices the Government is to pay a further sum equal to 4 per cent of the selling prices, to cover compensation or commission to approved dealers for their services in collecting and distributing wool.

Profiteering prohibited.

As a guard against profiteering, the books of all approved dealers in distributing centers shall be at all times open to Government inspection, and if it be found that their gross profits, including the aforesaid commission of 4 per cent, are in excess of 5 per cent on the season's business, then such gross profits shall be disposed of as the Government decides.

The books of the country dealers shall likewise be open to Government inspection. If it be found that their gross profit for the season's business is in excess of 1½ cents per pound, then such excess profits shall be disposed of as the Government may decide.

Distributing centers.

The approved distributing centers for fleece wools are:

Boston, Mass.	Chicago, Ill.	Louisville, Ky.
New York, N. Y.	St. Louis, Mo.	Baltimore, Md.
Philadelphia, Pa.	Detroit, Mich.	Wheeling, W. Va.

In the Willamette Valley, Oreg., and the Puget Sound district of the State of Washington the regulations in regard to fleece wools shall apply.

All territory wools must be consigned to one of the designated distributing centers, which are as follows:

Portland, Oreg.	New York, N. Y.	Boston, Mass.
Chicago, Ill.	St. Louis, Mo.	Philadelphia, Pa.

—Government Regulations for Handling Wool Clip of 1918, op. cit.

Third Period.

It was a difficult question to decide upon the policy to be adopted by the Government during the transition to peace conditions. It is apparent that the situation as it existed on November 11, 1918, was an entirely artificial one, governed by the exigencies of the war. Great Britain was controlling her wool stocks and her woolen mills primarily in the interest of her army and navy, and we were controlling our domestic market and manufactures and the foreign wool markets over which the nature of the case gave us a certain degree of control—i. e., the South American woolgrowing countries—in the interest of our military establishment. The English and American markets were kept sharply distinct and noncompetitive after the exercise, in 1916, of control over the Australasian wool clip by the British Government. Control in this country came so much later that the price level existing was much higher than in England. This is shown by the figures given below.[115]

The situation was fraught with unpleasant possibilities for practically all interests concerned—at least, on this side of the water—woolgrowers, wool dealers, manufacturers, and wholesale and retail merchants of cloth and clothing. An immediate break in the American price of wool, which seemed to threaten, would have meant serious loss for the owners of stocks of any kind, from the raw material to the finished product.

Continuation of the requirement of licenses for the importation of wool was advocated, but the War Trade Board decided that the war

[115] *Relative values of wool in seaboard markets, United States of America, and in London.*

Description.	United States Government issue price during the war period.	Per cent shrinkage.	Grease price.	Clean-scoured price, similar British wool.	Equivalent grease price, British wool.	Grease prices at United States auction, Jan. 22 23 1919.
Ohio fine delaine, unwashed	$1.90	60	$0.76	$1.51	$0.60½	$0.60 $0.62
Good, fine clothing, unwashed	1.75	63	.64¾	1.43	.53	.53- .54
¾ blood staple	1.75	55	.78¾	1.45	.65½	.65- .66
¾ blood staple	1.55	47	.82	1.19	.63	.62- .64
¾ blood staple	1.40	42	.81½	1.01	.58¾	.60- .62
Low ¾ blood	1.25	40	.75	.86	.51½	.49- .50
Fine medium territory staple	1.83	67	.60½	1.49	.49½	.48- .49
Territory ½ blood staple	1.75	62	.66½	1.43	.54½	.54- .55
Fine medium territory clothing	1.75	70	.51	1.43	.43	.43
Territory high ¾ blood, 56s-58s	1.55	58	65	1.32	.55½	.57
Territory ¾ blood, 50s-56s	1.47	55	.66	1.19	.53¾	.....
Territory high ½ blood staple, 48s-50s	1.42	52	.68	1.01	.48½	.48
Territory ½ blood staple, 46s-48s	1.38	50	.69	.93	.46½	.....
Territory low ½ blood staple	1.23	48	.64	.86	.44¾	.45

Wool Growers' Association denied it. The two estimates are herewith compared.[116]

It will be noted that Mr. Patterson did not estimate the portion of the 1917–18 clip which was used and the portion which was carried over.[117]

The National Wool Growers' Association, it will be seen, placed its estimate of the total 1918–19 clip for the three countries at a lower figure than did Mr. Patterson. (Mr. Patterson, 3,100,000 bales; National Wool Growers' Association, 2,618,000 bales.)[118] As it turned out Mr. Patterson's estimate was more nearly correct. The Wool Growers' Association purported to give the amount of wool over and above the normal supply which would be available on June 30, 1919. An estimate was included of the amount of wool which was consumed from June 30, 1918, to January 1, 1919, but not the amount which would be used up to June 30, 1919.

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[116] Mr. Patterson's statement:

British imperial wools.

[Australasian and South African.]

	Bales.	Average weight per bale.	Pounds.
		Pounds.	
(c) Carried over in Australia from 1917	1,000,000	318	318,000,000
(a) Carried over in New Zealand from 1917	435,947	327	142,554,669
(b) 1917-18 clip:			
Australia	1,907,331	331	631,326,561
New Zealand	581,531	331	192,486,761
(e) 1918-19 clip:			
Australia (estimated)	2,000,000	320	640,000,000
New Zealand (estimated)	600,000	320	192,000,000
Total	6,524,809	.....	2,116,367,991
(c) Carried over in South Africa from 1917	70,000	350	24,500,000
(c) 1918 clip (estimated)	400,000	350	140,000,000
(c) 1919 clip	500,000	.....	175,000,000
Total	970,000	.....	339,500,000

Wool carried over from 1917 plus 1917-18 clip and 1918-19 clip equals 7,494,809 bales.
Authorities for above figures:
(a) Daigety's Annual Wool Review, 1917-18, p. 14.
(b) Daigety's Annual Wool Review, 1917-18, p. 74.
(c) G. & W. Townend's Annual Wool Report, Dec. 31, 1918.

[117] Statement of the National Wool Growers' Association:

	Bales.
Unexported on June 30, 1918:	
In South Africa	160,000
In Australia	1,200,000
In New Zealand	475,000
	1,835,000
1919 clip	2,618,000
	4,453,000
Australian, South African, and New Zealand wool consumed by Great Britain and other countries, June 30, 1918, to Dec. 31, 1918	1,300,000
	3,153,000
Normal supply on hand about	1,153,000
Great Britain's surplus over normal supply	2,000,000

[118] Australian bales of 330 pounds each.

Both estimates were very imperfect efforts to arrive at definite conclusions regarding the oversupply. The price situation during 1919 indicated that there was an oversupply of medium and low wools but no surplus of high-grade Merino wool. European countries increased their consumption of wool but slowly during 1919 and 1920, and on June 30, 1920, when imperial control over colonial wool ceased, the British Government owned 2,905,554 bales of wool, more than half of which was crossbred.[119]

There was thought to be more wool available for the use of American manufacturers in 1919 than would be needed. The War Department made public, on March 20, 1919, the following statement regarding the wool transactions of the Government:

Total wool purchased and contracted for by the United States Government ..... pounds	722,450,168
Total cost to Government	$504,781,206
Total amount of wool disposed of by the United States Government, Feb. 15, 1919 ..... pounds	235,349,628
Amount received	$193,347,536
Wool remaining in possession of Government, including stocks on hand and contracted for ..... pounds	487,100,540

The last figure included a large amount of Australian wool for which the Government had contracted, but which it eventually did not have to take.

The domestic clip was estimated at about 300,000,000 pounds, as usual, which made the probable supply for 1919 much in excess of the normal demand. Despite the forebodings of the growers, however, the 1919 domestic clip was marketed at good prices. The mills of the United States used 617,000,000 pounds of wool in 1919. Prices remained high through the early months of 1920. The average price for the first two months of 1920 was fixed by the United States Bureau of Markets at $0.53.[120]

Relation Between Our Method of Control and England's.

The issue prices which were in force when the armistice was signed were continued until April 1, 1919, when they were reduced 7½ per cent. Auction sales of wool were held in London, beginning the first week in April, with the excellent results noted above. The new schedule of prices was put in force for eight months, in order that the trade might be able to make calculations accurately and go ahead without worrying about a sudden drop in prices. As the British issue prices constituted the minimum prices at the United States Government auction sales, conditions seemed to be equalized as nearly as possible for British and American manufacturers. The United

[119] The Market Reporter, U. S. Department of Agriculture, Bureau of Markets, Aug. 28, 1920, p. 140.
[120] Ibid., Apr. 3, 1920, p. 209.

States Government suspended its auctions from July 1 until November 1, 1919, so that the domestic clip might be marketed without competition from the Government. By these provisions all parties interested were protected from any immediate break in the market.

The United States Government Wool Auctions.

The great majority of the United States Government auction sales were held in Boston, but a few were in Philadelphia and in Portland, Oreg. The Australian wools, the fine "Territories" and the "Delaines," sold readily and brought good prices, but the low-grade domestic wools, the pulled wools, and the South American stock moved very slowly.

Considerable uncertainty existed at first because the Government officials did not announce the method of arriving at the minimum prices. About January 15 it was announced that the Government minimum prices were fixed at an amount approximately equal to the British civil issue prices and the market immediately took on a firmer tone. There was an even stronger note of optimism, after about the 1st of March, 1919, as it became evident that under the system of control adopted the chance of a glut in the market was not imminent.[121] Keen bidding and high prices marked many of the sales. One of the trade papers stated that "Everywhere in the Boston wool district there is a note of optimism among traders. * * * The brisk demand for wool, particularly of the fine grades, has kept up and increased, practically all the houses being engaged in trading to some extent. The larger houses, as well as the smaller dealers, report greater activity than for several months. Manufacturers have been especially anxious to secure wools."[122]

The prices of the better grades held up very firmly, as may be seen by comparing the prices obtained at the first two sales on December 18 and 19, 1918, with prices at the sale on March 14, 1919.[123]

An effort was made by some of the wool manufacturers to have the Government sell at the minimum prices between the auctions the wool which was withdrawn, but this the wool distributors refused to do.

[121] Mill repairs postponed until after the armistice were also finished about this time.
[122] New York Daily News Record, Mar. 22, 1919.
[123] Prices at U. S. Government sales.

Fleece.	Average selling prices on Dec. 18 and 19, 1918.	Range of prices obtained at sale of Mar. 14, 1919.
Fine Delaine:		
Choice	$1.70	$1.60-$1.70
Average	1.63	1.56- 1.62
¼ Blood staple	$1.50- 1.55	1.48- 1.57
⅜ Blood staple	1.21- 1.32½	1.35- 1.40
½ Blood staple	1.35- 1.40	1.05- 1.16

(Continued on following page.)

Marketing of 1919 Domestic Clip.

After the temporary cessation of Government auctions, which took place on July 1, 1919, the War Department gave out the statement that since the beginning of the auctions in December, 1918, it had sold over 315,000,000 pounds, having left about 145,000,000 pounds, mostly of foreign wool. Twelve million pounds of this amount was carpet wool. A very large portion of the remainder was wool grading one-fourth blood and lower.[124] The demand for the better wools had been very well sustained up to the 1st of July, and prices obtained were excellent. The auctions were suspended, as planned, during the months when the domestic clip of 1919 was being marketed. The rising price of the fine Merino wools in London and Boston gave a strong tone to the market, and in the autumn of 1919 and winter of 1919–20 the tendency of prices of the better wools was almost constantly upward.

When the Government auctions began again, the fact that the best wools had been sold from the stock caused the prices obtained to be somewhat lower than in the auctions of the early summer, but the figures reached were satisfactory, considering the grades offered. On June 30, 1920, the wool holdings of the Government had been reduced to 44,202,903 pounds, mostly of the lower grades.[125]

[125] Prices at U. S. Government sales—Continued.

TERRITORY.

Fleece.	Average selling prices on Dec. 18 and 19, 1918.	Range of prices obtained at sale of March 14, 1919.
Fine staple	$1.60-$1.65	$1.40-$1.61
Fine clothing	1.40- 1.50	1.45- 1.54
TEXAS.		
12 months	$1.35-$1.40	$1.31-$1.38
AUSTRALIAN.		
64-70's warp	$1.70-$1.80	$1.70-$1.85
64-70's	1.65	1.58- 1.69
SOUTH AMERICAN.		
50/56's good	$1.30	$1.15
46's good	1.20	1.03

[124] New York Daily News Record, Aug. 9, 1919.
[125] The Market Reporter, Aug. 7, 1920, p. 93.

Australian Wools.

During the summer of 1919, Mr. A. W. Elliott went to England and secured the release of the Government from the obligation to take the Australian wool allotted to this country during the threatened shortage of the preceding year. The need for more fine wools became increasingly apparent, however, and the British Government was persuaded to send some Australian wool to Boston to be auctioned there. The amount to be sent was unknown and great apprehension was aroused among American wool growers by reports that the manufacturers were trying to "break the market" by these importations. Assurances were given that the imports were intended only to satisfy the urgent demand for fine wools, arising from the great popularity of fine fabrics. The wools of that class sold at high prices at the auctions held in Boston during January and February, 1920, by the British Government. Some of the later auctions were not so successful.

Depressed State of Wool Market, 1920.

The mills of this country operated actively during 1919 and the exports of woolen goods were maintained at a high point. Those who feared a slump in the price of wool at that time apparently underestimated the demand for fine goods. This demand was one of the remarkable things in the economic history of the period following the close of hostilities.[126]

The following year disclosed a different state of affairs, however. The existence of large stocks undoubtedly had an influence in producing the depressed state of the wool market which existed during

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[126] Prices of wool in Boston market, first week in March, New York Daily News Record, Mar. 8, 1920:

Territory wool.	
Fine staple, scoured basis	$2.05–$2.15
¼ blood staple, scoured basis	1.80– 1.85
⅜ blood staple, scoured basis	1.30– 1.38
½ blood staple, scoured basis	1.10– 1.15
Fine clothing	1.85– 1.90
Fine medium clothing, scoured basis	1.70– 1.75
Ohio fleece, greasy.	
Fine washed delaine (quantity so small practically unquotable).	
Fine unwashed delaine	$0.97–$1.00
XX and above, washed (quantity so small practically unquotable).	
Fine unwashed clothing	.73– .75
¼ blood combing	.85– .87
⅜ blood combing	.69– .71
½ blood combing	.65– .67
Foreign.	
Cape 12-month scoured basis	$2.10–$2.25
B. A. crossbreds 44s–46s	.60– .65
B. A. crossbreds 50s	1.05– 1.10

the summer of 1920. Also, the cancellation by clothing manufacturers of orders for cloth, due partly to restriction of credit, but mainly to the refusal of the public to pay the high prices asked for clothing, brought about a peculiar situation in the wool market in May, 1920. It could hardly be termed a collapse of wool prices but was rather an entire obliteration, for a time, of the market for the domestic clip. Some sales had been previously consummated at approximately the 1919 prices and then suddenly wool could not be disposed of at any price. There was for several months hardly enough trading in wool to establish a scale of prices. Some clips were sold on a basis not greatly below the old price range, but the volume of business was very small, and the greater part of the 1920 domestic clip was stored. Representatives of all branches of the trade and of banking interests, both eastern and western, met with the Federal Reserve Board in June and sought financial relief for the growers. The Board recommended that the local banks extend aid to the growers by means of commercial acceptances, secured by bills of lading or warehouse receipts. Some growers were financed in this way, some consigned their wool to dealers, frequently on an advance of 10 to 30 cents, while others, better situated financially, merely put their wool in the warehouse and awaited developments. The summer and fall of 1920 was a period of uncertainty in all branches of the trade from grower to manufacturer.

PART II.

WOOL GROWING IN THE UNITED STATES.

CHAPTER 4.

THE SHEEP INDUSTRY IN THE EAST.[1]

HISTORICAL BACKGROUND.

In the North Atlantic States the number of sheep declined rapidly after the middle forties. Until that time Merino sheep had been kept chiefly for wool production. Thereafter such animals could not, in most localities, continue to compete with similar types west of the Alleghenies. It cost practically twice as much to produce a pound of wool in the East as in the West. With the largely increased demand for and more favorable prices of wool during the Civil War period, the decline was arrested for a time and the number of sheep practically doubled between 1860 and 1867, but following a readjustment between prices for sheep and wool and for other agricultural products, there was an immediate and precipitate decrease in number of sheep thereafter. By 1871 there probably were no more in the North Atlantic region than if there had been no impediment to the earlier decline, and the number continued to decrease. The period of free wool during the nineties finally demonstrated the unfitness of a finewool sheep husbandry to this region, and the remnants of the old commercial Merino flocks were largely eliminated. The table just below shows the extent of these changes.

TABLE XIX.—*Number of sheep in the North Atlantic States, 1840–1900.*[a]

[000 omitted.]

State.	1840	1850	1860	[b] 1867	[b] 1871	[b] 1884	[b] 1893	[b] 1897	1900	1910
Maine	649	452	514	896	415	577	399	230	252	150
New Hampshire	617	385	317	623	234	210	136	78	65	31
Vermont	1,682	1,014	770	1,336	548	449	330	158	182	84
Massachusetts	378	189	123	199	72	69	53	42	34	23
Connecticut	403	174	120	188	81	59	42	32	23	14
Rhode Island	90	44	38	37	30	21	12	11	7	4
New York	5,119	3,453	2,621	5,373	2,080	1,732	1,493	809	985	606
New Jersey	219	160	147	190	127	117	61	41	26	17
Pennsylvania	1,768	1,822	1,685	3,457	1,763	1,749	1,637	799	959	638
Delaware	39	28	19	18	25	22	14	12	7	4
Maryland	259	178	157	278	135	172	151	125	112	126
Total	11,224	7,899	6,512	12,595	5,510	5,177	4,328	2,337	2,652	1,697
Total United States	19,311	21,723	23,997	39,385	31,851	50,627	47,274	36,819	39,853	39,644

[a] Some lambs probably included in certain of the census years.
[b] Estimated by U. S. Dept. of Agriculture.

[1] Maine to the Potomac River: For purposes of comparison between census and estimated figures (which are not available by counties) the statistics used in this chapter cover the fine wool counties of southwest Pennsylvania, but in the discussion this area is not considered a part of the region here dealt with.

COMPETITION WITH OTHER FARM ENTERPRISES.

Change in Type of Sheep Kept.

Where sheep were retained, there was a slow adoption of crossbred and mutton types, chiefly for mutton and lamb rather than for wool production, after 1845. Except in areas most favorable for sheep and in the stud-flock sections of certain of the States, the eastern producer steadily turned his attention to other live-stock or crop enterprises. Dairying was especially competitive with wool production, and between 1845–1860 dairy cows appear to have increased proportionately as rapidly as sheep declined. This interchange was far more noticeable in favor of dairying after 1870, owing to the rapid urban growth of the postbellum period.

Within a comparatively short time after 1870 the Merino was replaced very largely by mutton breeds in the North Atlantic States, but the industry as a whole steadily declined in the face of competition with other agricultural enterprises. Producers, therefore, not only turned to mutton breeds but within a comparatively brief period in most cases they kept sheep distinctly as a secondary enterprise on the farm.

A considerable admixture of longwool blood originally present gradually was replaced by that of the Down breeds, as the production of heavy wethers called for by the urban markets became generally changed to a demand for lamb after 1870. This alteration in market demand enhanced the net returns from flocks. Only too often, however, the sheep kept, instead of showing fairly well-defined breed characteristics, became a heterogeneous mixture of a number of breeds. In such cases this meant a depreciation in quality of the wool clip and a logical reduction in its value. With the change to lamb production, however, the importance of revenue from wool in the flock receipts decreased.

Lack of Tariff Influence.

During the time of the East's dominance in wool production in the United States (1830–1845) the high tariff which prevailed during a large part of the period was of less importance to the industry than the contemporary rapid growth of wool manufacturing and a combination of factors inimical to competition from the West. The subsequent changes just discussed—the steady modification of type of sheep, the displacement of the industry by more profitable lines of production, and the slow decrease in relative importance of the wool clip—took place coincidentally with a high tariff on wool. Commercial finewool flocks, whether kept as a major or as a minor enterprise, were not able to compete with other farm activities or with mutton breeds of sheep. Even the general adoption of the latter,

and the decline in importance of wool as against mutton and lamb, failed to prevent a steady decline in number of sheep kept. Other farm products paid better returns on capital and labor.

Nearly all of the stud-merino flocks which had held on chiefly in Vermont and New York finally shared the same fate as the grade flocks of the North Atlantic section. With the development of smooth bodied Merino types and their adoption on the ranges of the West, and the adoption of similar types in Australasia and most of South America, the breeders of the wrinkly Merinos lost the bulk of their market. The number of such flocks declined rapidly after the early nineties and very few of them are now left.

Present Status of Sheep Husbandry.

At the present time, with some exceptions (notably in the case of the Cheviot), sheep of the various Down breeds largely predominate in the North Atlantic States. They are used primarily as a side line in general farming and are depended upon to clean up fence rows and odd corners, to graze the rougher pasture areas, and to consume in winter a part of the unsalable roughages which otherwise would be less completely used. Except in the case of hothouse lamb production, and in certain of the orchard counties along Lake Erie, as well as in the bean-growing section of western New York, where sheep are kept on high-priced land, the flocks are usually confined to areas where relatively low land values prevail. They are often kept on farms which also carry beef cattle or dairy cows, but such farms have a surplus of rough pasture or have pastures too distant from the farmstead to be economically grazed by the cows. Rape and other forage crops grown specially for sheep are little used in most parts of this region.

FLOCK MANAGEMENT.

The lambs are dropped chiefly in April and marketed from grass from July onward, principally after the 1st of September. About the middle of August prices to the producer drop to the September-December level. Probably one-half of the lambs disposed of prior to September 15 are sold to local butchers or are slaughtered on the farm and sold locally in the carcass, mainly for vacationist and tourist use. Such disposal is less general thereafter. Probably two-fifths of all the lambs disposed of are so sold. The rest are sent to market, mainly after September 1. More than one-half of the native crop, therefore, competes on the market with the peak of the movement from the western ranges and is sold at the least profitable season, with logical effect on receipts from the flock. The lambs rarely receive any other feed than the dam's milk and pasturage.

The number of producers who breed to drop the lambs early and market them before the first or middle of August is relatively small, particularly north of Maryland. Owing to the higher feed cost before pastures are ready in the spring, farmers north of the Potomac and Ohio Rivers do not believe that their early lambs can compete with those of sections further south. On the other hand, while those who are now growing early lambs have higher costs than those sold after September 1, their larger receipts more than offset the increase in costs, and they have much less trouble with internal parasites, particularly in their lambs. This is another factor in the enhancement of their flock receipts. Such farmers, however, are good shepherds who give their flocks the same care as is bestowed on other classes of live stock. Receipts from sales of wool form a smaller percentage of their total flock receipts than is the case in the region as a whole.

Lambs reaching the market after September 1 carry a considerable number of culls. As high as 70 per cent has been estimated by stockyard agents. This inexcusably high ratio, largely due to coarse, bucky males, not only cuts down the returns to shippers by $1 to $5 and sometimes to $7 per hundred pounds, but tends to depress returns for all lambs, because lamb consumption is discouraged by the poor quality of these cull animals which flood consuming markets during the fall months.

Hothouse Lamb Production.

Hothouse lambs are produced by farmers scattered throughout the region, but the percentage of all sheep raisers who grow them is very small. The production has declined in the last few years, principally because the price for this fancy grade lamb has failed to rise in proportion to the rise in the price of feeds. Restriction of meat consumption during the war by those who furnished the market for such lambs seriously depressed the demand for them. As a result many former growers of hothouse lambs have turned either to early lamb production or now market their product with the bulk of the native crop, or a combination of the two. This phase of sheep husbandry will never be an important factor in wool production in the United States. Probably less than 3 per cent of the clip north of the Potomac comes from such flocks. Wool production, however, normally is but a minor item in the production of hothouse lambs.

RECENT NUMERICAL CHANGES.

During the past four years there has been a slow increase in the number of sheep north of the Potomac River. The change in numbers since 1910 is shown in the table following.

TABLE XX.—*Number of sheep in the North Atlantic States, 1910–1920.*[a]

[000 omitted.]

State.	1910	1917	1920	State.	1910	1917	1920
Maine	150	114	131	New Jersey	17	16	16
New Hampshire	31	25	28	Pennsylvania	638	599	678
Vermont	84	71	75	Delaware	4	5	6
Massachusetts	23	17	21	Maryland	126	119	133
Connecticut	14	11	18				
Rhode Island	4	3	4	Total	1,697	1,502	1,647
New York	606	522	537	Total United States	39,644	35,998	36,753

[a] Estimated by the United States Department of Agriculture as of Jan. 1. The department estimates are revised to the basis of adult animals in the same proportion as present on Apr. 15, 1910. The above figures do not include feeder lambs on hand in the early winter and being fattened for market before or after shearing the following spring. These figures are presented purely for their suggestive value as indicating the recent growth of the sheep industry in this region.

Types Involved.

The estimated number (revised to animals of shearing age) on January 1, 1917, was 1,502,000, but by January 1, 1920, increased to 1,647,000. By far the greater part of this increase resulted from the saving of native ewe lambs. In 1918 especially there was a striking scarcity of females in the market receipts until late in the fall, when the late-born lambs, those most liable to infection by internal parasites, were moving to market. There were considerable numbers of Delaines shipped into parts of the region, principally New York and Pennsylvania from Ohio and the similar finewool section of southwestern Pennsylvania, but the total increase due thereto was relatively small. There was also an increase in the number of western ewes sent out from Buffalo, but most of these went to western New York, and to a large extent merely replaced former shipments of similar sheep which had outlived their usefulness on the New York farms. The character of the wool clip of the North Atlantic States as a whole was but little affected by the increments from these two sources. The gain above outlined was largely due to the pronounced rise in wool and mutton prices of very recent years and in part to propaganda in favor of sheep on the part of private, State, and Federal agencies.

Along with this increase in numbers there has been an appreciable gain in the quality of sheep kept and of wool and lambs produced, as well as in the preparation of the fleece for market. Owing to rapidly rising prices a steadily increasing number of the producers have become actively interested in better types of sheep, particularly through breeding up with larger, more robust, better-type rams. The demand for purebred bucks has been especially marked. It was not long before the lambs reaching the market showed the effects of the better sires. Dark-faced lambs, as distinct from those with mottled and nondescript face colorings, have become the rule during the past six years. On the whole, however, the improvement

in type of lambs has been a gain in quality rather than in weight and there has been an earlier readiness for market. The latter part of the lamb run shows much less improvement in quality than those shipped before September 1, and although the proportion of total flock receipts derived from wool sales had a downward tendency as a result of this breed improvement, flocks producing early lambs were chiefly affected.

During the three years prior to 1920, with the pronounced rise in wool prices, the producers have emphasized the weight of the wool clip far more than for several decades previously. Larger sheep have, therefore, been more popular, as it was believed that they carried more wool. At the same time they made heavier lambs. The rising wool prices have also given much emphasis to teachings of sheep specialists with reference to selection of animals for type of fleece as well as to preparation of the clip for market. Sisal twine, for tying the fleece, has been largely replaced by paper or hard jute twine; more care has been taken in removing the fleece and in sacking without dung locks and other refuse. Recent cooperative sales by the producers by means of wool pools, with grading of the fleece before the eyes of the growers, has also had a marked effect in stimulating betterments in handling of the sheep before shearing and of the wool afterward. This emphasis on wool has no more than offset previous neglect of the clip, and the real ratio of receipts from sheep and lambs as against those from wool has been relatively little affected. Until 1915 approximately two-thirds of the returns were from sales of mutton and lamb and one-third from wool.

Outlook for Permanence of Recent Increase, Local Decline Probable.

There are a number of factors which would seem to indicate that a continuation of the recent increase in number of sheep in the North Atlantic States is doubtful. All prices for farm products are high, and the farm labor scarcity of the past three years should soon be somewhat relieved. Sheep, then, will have to compete with general farming and with other live-stock enterprises, especially with dairying, rather more sharply than just previously. In the bean-growing region of western New York, where sheep have been kept on high-priced land principally because of their superior utilization of bean straw, it seems probable that the number of animals will decrease. Bean production in this area has decreased steadily during the past few years, and the New York authorities expect sheep to decline as a result.

Sheep versus Dairying.

An interesting fact in the recent increase in the number of sheep was their local replacement of dairy cows. This interchange was not at all widespread, and in the region under discussion appears not

to have appreciably affected localities furnishing market milk for urban consumption. In the areas where it has occurred producers making the change usually were so far from factory or loading point that the price received was deemed unsatisfactory when compared with the labor involved. An added difficulty was the farm labor question. During the war there was frequently not enough skilled labor to run the dairy. Some of the cows therefore were disposed of and sheep sometimes were bought to utilize the surplus pasture area thus created. It is possible that in some extreme cases the effect of this replacement of cows by sheep will be noted for some time, but in general it would not appear that the change will prove lasting. Sheep have not been able to compete with dairy cows when the prices for dairy products have been fairly remunerative, save in localities where natural conditions strongly favor the sheep.

The Fencing Problem.

Another factor is the matter of fencing. On large areas in parts of Pennsylvania, New York, and New England, the old rail fences have rotted away, the stone fences have sunk into the ground, and wire fences erected later have greatly deteriorated if not become practically useless. These generally are old deforested sections with poor soils. On many of the more elevated hill roads frequently 50 per cent of the farm houses are deserted or have burned down and have never been replaced. Where stock fences have been recently put up the operators have usually erected four or five strands of barbed wire to turn cattle rather than the more expensive woven-wire fences necessary to turn sheep. Although sheep could be herded on these lands where a sufficient contiguous area can be secured to make it practicable (as is now being done in a few instances), the problem of winter feed is a serious one. In many parts of such areas operators who are running cattle but have surplus areas of pasture, or pasture so rough that it would be better utilized by putting on sheep, have not done so because they could not afford the expense of woven-wire fencing.

A further deterrent to continued increase in sheep has been a rather widespread ignorance of their management, though this is fast being corrected. The older generation of shepherds has long since passed away and to the bulk of the present generation sheep husbandry is a comparatively new subject. Many men without previous experience with sheep, tempted by the high prices of the past few years, adopted them on a considerable scale only to lose heavily on the venture.

Realization of Sheep Values.

On the other hand, producers are rapidly coming to see the error of a belief which was quite general until comparatively recently—that the sheep is not a farm animal. They are becoming cognizant of the fact that a flock of good mutton type of sufficient size to war-

rant the use of a good buck and adequate feed and care, has a real place on most general farms of moderate size. They have also learned that when properly handled such a flock normally gives a relatively large net return on the investment. It seems now to be generally agreed that sheep give as good or better returns with a minimum of grain feed and a maximum of grass and forage than any other class of live stock and that when properly managed they are unexcelled for cleaning up and improving deteriorated pastures. Most of the men who have recently adopted sheep have discovered that sheep are distinctly a farm animal, and that with proper stocking, sheep and cattle not only can usually be run together, but that in most cases the pasture steadily improves as regards elimination of weed and brush growth and increasing density of the sod. At the same time, recent changes in the dog laws of most of the States have been distinctly favorable to the adoption and retention of small flocks. A factor which has been very discouraging in recent years has thus been to a large extent nullified, and producers feel that their flocks are no longer entirely at the mercy of every wandering dog. Then, too, the recent increase in numbers has been almost entirely in small flocks for use distinctly as a side line in general farming. The animals have been secured in flocks of a size usually most favorable for their continued successful competition with other farm enterprises. On the whole, until the recent collapse of the wool and lamb market, conditions indicated that the recent increases in the North Atlantic States would result in a small permanent gain in number of sheep. Whether or not the opposite now takes place depends to a considerable extent on developments in the wool and lamb market.

CONCLUSION.

In the North Atlantic States, by a process of slow evolution, the sheep industry has become fixed as an agricultural enterprise of purely secondary importance. In 1910[2] only 11 per cent of all the farms in the region reported sheep. There appear to have been two sizes of flock most common on farms carrying sheep at that time. One consisted of about 10 to 15 animals of shearing age, the other of about 30 to 40 head. Outside the finewool section of southern Pennsylvania breeding ewes formed 95 per cent of the flocks. The size of flock is an excellent indication of the secondary importance of sheep in the region. The predominance of ewes suggests that the bulk of the receipts came from sheep and lambs sold or slaughtered. Thirty-nine per cent of the reported total flock receipts came from wool sales in 1910. This percentage was affected somewhat by the wool clip in southwestern Pennsylvania. It would have been lower

[2] U. S. Census, 1910, vol. 5, pp. 68 ff., 402 ff., 502–3, 528.

but for the fact that a very large part of the lamb crop moved to market after September 1 in competition with the peak of the range run as well as with the bulk of the native crop of the Middle West, and helped to force down prices received for all lambs. In this the large percentage of cull animals played an important part.

Subsequent breed improvement has resulted in a general betterment of quality of lambs, especially of those marketed before the 1st of September. As a result, the proportion of the lamb crop disposed of during the period when higher prices prevailed has been increased. The latter part of the lamb run also shows somewhat better quality, and the percentage of cull lambs was appreciably decreased up to 1919. These factors tended to enhance the importance of receipts derived from mutton and lamb at the expense of receipts from wool. But the rise in price of the wool following 1915 was relatively greater than the rise in mutton and lamb prices, and stimulated further breed improvement. The aim was to secure better and more wool, but as a Down ideal was in mind, Downs were used to secure it, and as much or more betterment was made in carcass as in fleece. The disproportionate rise in wool prices operated only to offset the earlier disregard of the wool clip and has tended toward a more efficient sheep husbandry in this region. As virtually all of the improvements made have been with those breeds which were evolved for greatest return from carcass, with secondary emphasis on wool, the producers have really been breeding for prewar market conditions.

The existence and extent of wool growing north of the Potomac River depend primarily upon the relative profits of sheep husbandry as contrasted with other agricultural pursuits. More remunerative lines of farm production have forced sheep husbandry to become distinctly a side line on nearly all farms which carry sheep in this region. In this secondary enterprise wool occupies a subordinate place. The shepherds themselves can markedly affect returns from lamb and mutton by minor changes in flock management on most farms, attended when practicable by logical advancement in the period of marketing. Improvement in quality and some readjustment in marketing are the chief problems confronting the producers of this region. Competition with foreign wool would seem to be of less importance than the management and marketing problem just indicated, although low wool prices always affect returns from sheep and lamb sales.

Chapter 5.

THE SHEEP INDUSTRY IN THE SOUTH.[1]

HISTORICAL BACKGROUND.

In the South, save in a few instances, sheep have never been an important live-stock enterprise outside of the Virginias, Kentucky, and Tennessee. Before the Civil War they were kept chiefly for plantation meat supply and for use of the fleece in household industry. In the northern parts of the region such uses were important, but the industry was on more of a commercial basis than farther south. Before the middle of the past century large numbers of sheep were driven out each year from west of the Alleghanies, more especially from Kentucky, for fattening in the East, north of the Potomac River. A decline in number of sheep between 1850 and 1860 in the four States named above was due to competition from other agricultural enterprises. The increase in the rest of the region was due primarily to the large amount of land available for grazing and stocked below capacity. In both parts of the region sheep raising was about equally hard hit by the Civil War and its results. In the eastern and southern sections it recovered more slowly, primarily because sheep husbandry played an unimportant part in their agricultural production.

Originally many animals of approved breeds, both Merinos and mutton types, were brought into this region, but aside from a few areas they did not have a permanent effect on the type of sheep kept. In the rich blue-grass section of Kentucky, and to some extent in similar areas in Virginia and Tennessee, much care was often devoted to development of flocks of good type. Owing to the rich grazing, the mutton breeds were chiefly valued in such localities, and as long as the market stressed heavy mutton production the longwools were largely used. In these sections, prior to the nineties, mutton was about as important as wool in the total flock receipts, and most wethers were disposed of after their first or second fleece was shorn. In the rougher areas the sheep frequently became rather nondescript in character as a result of lack of care in selection of breeding animals, and more Merino blood was present.

[1] The Virginias, the Carolinas, Georgia, Florida, Alabama, Mississippi, Louisiana, Arkansas, Tennessee, Kentucky. The finewool section of West Virginia is not discussed herewith, though in order to compare estimates with census figures the statistics of the entire State are included with those presented in this chapter.

EVOLUTION OF PRIMITIVE TYPES.

Partial Lack of Tariff Influence.

After the Civil War, in the Piedmont and tidewater areas, sheep steadily concentrated in the sparsely settled longleaf pine belt, where they ranged practically wild throughout the year. As the number increased to prewar figures after 1870, the gains were chiefly in or near this belt and almost always in the hands of relatively few owners. Earlier attempts at herding were abandoned after the Civil War and the animals were merely rounded up early each summer for shearing, branding (ear cuts or jaw brands), and altering of males. They were kept for their wool almost entirely. All strains originally present blended into the distinct type later known as the "Piney-woods" sheep. Denied the slight protection formerly furnished by the herders, ability to take care of themselves became the chief requisite for continued existence. They were exposed to depredations by razor-back hogs, dogs, and various wild animals. The relatively sparse and unnutritious forest and cut-over vegetation necessitated wide foraging and played no small part in the evolution of a fine boned, narrow bodied type, which developed almost the speed of a greyhound. Ability to reproduce each year was their dominant type characteristic. Wool covering and weight of carcass were minor items. These sheep were virtually bare on leg and belly. Somewhat less than 3 pounds of wool per head from the flock as a whole was and still is a typical clip. The ewes, when in good condition, averaged about 60 pounds in weight after shearing, wethers 70 pounds. As the animals were on practically open range throughout the year and virtually the only expense was for the annual round-up and shearing, wool production from such flocks was virtually independent of foreign competition. The abolition of the tariff in 1894 really had less effect on the number of sheep than did a steady adoption of stock laws, which required all live stock to be kept within fence. Owing to the small clip per head and to the absence of other flock receipts, as well as to the low carrying capacity of forest and cut-over ranges, owners were not able to fence. They had to dispose of their sheep if they were unable to secure the use of open range.

In the mountain areas a similar greyhoundlike nondescript type of sheep developed, but it never lost the size of frame to the extent that the piney-woods type lost. The environment also necessitated the retention of more fleece covering, though practically bare legs and bellies also became the rule. These sheep weighed from 10 to 15 pounds more per head than the piney-woods type, and sheared about a pound more wool. As in the tidewater areas,

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Sheep industry of the United States

TABLE XXI.—*Number of sheep in the South, 1840–1910.*[a]

[000 omitted.]

State.	1840	1850	1860	[b] 1867	[b] 1871	[b] 1884	[b] 1893	1897	1900	1910
Virginia	1,294	1,310	1,156	701	395	487	498	393	392	439
West Virginia	.....	.....	.....	.....	563	671	841	458	573	567
Tennessee	742	812	803	261	400	655	541	382	308	470
Kentucky	1,008	1,102	1,006	933	904	980	1,237	738	716	778
Total	3,044	3,224	2,965	1,895	2,262	2,793	3,117	1,971	1,989	2,254
North Carolina	538	595	624	339	315	452	396	319	209	140
South Carolina	233	286	233	217	157	116	78	73	52	28
Georgia	267	561	633	346	270	543	433	345	259	153
Florida	7	23	32	6	31	99	106	98	103	95
Alabama	163	372	383	277	200	344	358	252	229	109
Mississippi	128	305	354	254	200	293	447	306	236	156
Louisiana	98	110	203	88	90	125	192	136	169	139
Arkansas	42	91	209	114	135	227	240	170	169	97
Total	1,477	2,343	2,671	1,641	1,398	2,199	2,250	1,699	1,426	918
Total South	4,521	5,567	5,636	3,526	3,660	4,992	5,367	3,670	3,415	3,172
Total in United States	19,311	21,723	23,977	39,385	31,851	50,627	47,274	36,819	39,853	39.644

[a] Sheep of shearing age, though some lambs probably included in certain of the census years.
[b] Estimated by the U. S. Department of Agriculture.

DEVELOPMENT OF THE EARLY LAMB SECTION.

By 1890 the lamb market in the United States began to develop rapidly, with marked effect on the industry in the Virginias, Kentucky, and Tennessee. The luxuriant growth made by winter grain during the mild winters especially favored early lambing and a heavy milk flow in the ewes. The open winters necessitated a minimum of shelter. The environment was favorable for producing lambs to be marketed by or before midsummer, i. e., when prices were highest, and a continuance of the flocks on a grazing basis practically the year round. In the more favorable areas the producers therefore turned quickly to early lamb production. Coincident therewith was the steady adoption of stock laws in the hill and mountain areas, where the producers usually did not even consider fencing for sheep and a retention of their flocks. The growers of early lambs therefore had readily available a supply of relatively cheap ewes because of the steady sale of mountain flocks. The ewes were bought for less than their lambs sold for, bred for one to three years and then replaced by purchase of similar animals. In 1891 such ewes were bought for $1.50 to $2 per head, and their lambs at about 4 months of age, when sired by a Southdown buck, sold at $3 to $5 each. In that year 3,000 lambs were shipped in one day from Winchester, Ky.[3] The ewes were often shorn of about six months' growth of wool before being shipped to market. The slower growing longwools previously popular for heavy wether production were rapidly re-

[3] U. S. Dept. of Agriculture, Special Report on the Sheep Industry of the United States (1893), p. 667.

placed by the quicker maturing Downs in the early lamb areas. Wethers were swiftly replaced by breeding ewes.

Effect on Other Parts of the Region.

It was not long before local hill and mountain flocks were seriously depleted. The producers in such localities in general appear to have sold out more thoroughly than would have been the case had the stock buyers been less active. The buyers then began operating in the hill sections of northern Georgia, Alabama, and Mississippi, where they were likewise favored by the passage of stock laws. When these flocks were virtually obliterated the buyers invaded the piney-woods country, whence large numbers were shipped into parts of Tennessee between 1911 and 1917. The decline already noted in the tidewater section was hastened by this means, as well as by settlement in the cut-over areas and multiplication of the enemies of the sheep—chiefly hogs and dogs.

Improvement in Early Lamb Types.

With the elimination of wethers in the early lamb areas the flocks consisted almost entirely of breeding ewes. The number of lambs raised in a given size of flock was increased proportionately. Owing to the number, quality, and weight of the lambs, returns were secured which considerably exceeded those from the former sale of wethers, and at little more cost. This was true even in sections where grade rams of not very good type were used. In the Central Tennessee Basin, 10 years ago, the weight of good lambs averaged 65 pounds per head in car lots at about 4 to 4½ months of age. This weight has since been increased to 75 pounds for similar lambs. Practically the same amount of improvement has occurred in the valley areas of the Virginias. In Kentucky, more especially in the north central parts, there was less room for improvement, but a considerable gain has occurred. The wool clip averaged 4.5 pounds in 1909 and 1910, and 4.8 pounds for 1916 to 1918, inclusive. The proportion of total flock receipts due to wool sales, therefore, became progressively less as the weight and quality of the lambs increased. Sheep husbandry thus became less and less affected by competition with foreign wools. A more widespread use of better rams, particularly of purebreds, was largely responsible for the gain in weight of lambs, but better breeding ewes were also a factor. Improvement was, however, partly effected by the use of good bucks and a slow adoption of the practice of retaining a few of the ewe lambs obtained from such bucks, as the supply of cheap breeding ewes decreased and the price of such animals increased. A part of the betterment in type of ewe resulted from an adoption of Down bucks in those hill and mountain areas where sheep were retained. Ewe lambs then were often held over and sold as

yearlings the next summer to men producing early lambs, while in the fall the wether lambs were disposed of as lambs. Some of the more favorably situated shepherds in these areas, especially in the hilly sections of Tennessee and Kentucky, have also adopted early lamb production, but in a large part of the mountain sections the character of the grazing is such that within the early lamb season the producers can not turn off lambs of a proper quality. Without a considerable change in management such areas probably will continue to furnish an appreciable supply of fall marketed lambs and stock ewes.

FLOCK MANAGEMENT.

At the present time in the early lamb areas the lambs are for the most part dropped between January 15 and April 15. In central Tennessee and southwestern Virginia the lambing period is at its height by February 1 and virtually over by March 1 in most instances. In north central Kentucky the lambs usually come from three to four weeks later. In most of the early lamb valleys of West Virginia they come about two weeks later than in central Kentucky.

The ewes are grazed on blue grass and harvest stubbles during the summer and fall. Some men keep them on blue grass throughout the greater part of the year, and do not graze the winter grain with sheep; others put the sheep on such pasturage in the late fall or early winter, as soon as the growth has become sufficiently rank to furnish feed. Many growers, particularly where there is a surplus of blue grass, reserve the winter grain fields until lambing or just before. Sheep remain on wheat fields until the middle of March or April 1, sometimes in more elevated situations until the middle of April in late seasons. Rye planted for grain is grazed a little later than wheat. The growers figure that if the grain is not too closely pastured the crop is distinctly better for the grazing and that the winter pasturage is secured without cost. Most men seed rye as a cover crop after corn or tobacco, the growth to be turned under for tobacco or corn early the following summer. In this case the sheep usually remain on the cover crop until the middle or the latter part of May. In such cases the lambs make a large part of their growth on the rye virtually without cost. Other cover crops, such as crimson clover, are similarly grazed.

As a general rule, relatively little hay or grain is fed in winter, and most of the heaviest charge against the animals in more northern sections is thus eliminated. In very wet weather or in periods of heavy snow the flock is usually fed some hay in racks or sheds, but in open winters 50 per cent of the producers feed nothing save at lambing

time. Even then, if the winter grain has a rank growth and the flock is not too large, they often feed only the weaker ewes or those with twins.

The practice of feeding varying amounts of hay and grain for lambing until the spring pasturage is good has been adopted by a large and increasing percentage of growers. A small number continue giving grain to the ewes until the lambs go, or feed grain to the lambs in creeps after the flock is on spring pasture. A very few do both. Their costs are higher, but their lambs are ready for market two or three weeks earlier than otherwise. The great majority produce lambs with a minimum of feed and labor, and with what their experience leads them to believe to be a maximum net return. If grain is fed after the grass is good it is to the cull ewes, in order that they may be fat enough to go to market with the lambs. In severe winters, however, exceptionally heavy losses of more than a local nature result from failure to provide for unusual feed requirements. A great many farmers also make little or no provision for shelter in severe weather other than a rude shed, and pay very little attention to the sheep even at lambing. The result is a heavy lamb loss if the weather turns bad at lambing time, owing to crowding in the shed, or to lambing in fence corners, and to chilling of the lambs before they are able to suckle. Ewe losses are sometimes heavy as a result of lack of shelter at this season and because of poor nutrition in many cases. It seems very probable that this small saving in overhead expense and in labor results in a smaller net return over a series of years. Many producers are correcting this weakness.

The movement of the early lambs to market begins in the latter part of May in Tennessee and in most of southwestern Virginia, soon after the 1st of June in north central Kentucky, and about the 1st of July in West Virginia. It is over by or soon after August 15, by which time the early crop from West Virginia has been disposed of. These lambs thus dominate the consuming markets from June 1 to August 15, save for lambs from certain areas in the far West. As the demand is strong and the supply relatively small during this period, the prices are high.

RECENT NUMERICAL CHANGES.

During the past four years there has been a slow increase in number of sheep in many parts of the South, and in the region as a whole. The following table presents the changes since 1910.

TABLE XXII.—*Number of sheep in the South, 1910–1920.*[a]

[000 omitted.]

State.	1910	1917	1920	State.	1910	1917	1920
Virginia	439	377	393	Florida	95	100	90
West Virginia	567	445	481	Alabama	109	93	105
Tennessee	470	355	346	Mississippi	156	154	140
Kentucky	778	659	706	Louisiana	139	156	180
				Arkansas	97	82	134
Total	2,254	1,836	1,926	Total	918	821	865
North Carolina	140	91	94				
South Carolina	28	22	20	Total South	3,172	2,657	2,791
Georgia	153	123	102	Total United States	39,644	35,998	36,753

[a] Sheep of shearing age. After 1910 estimates of the U. S. Department of Agriculture of the number on hand January 1, but revised to the basis of animals of shearing age as present in April, 1910, are used. These figures are presented purely for their suggestive value as an indication of recent changes in number of sheep.

The decline between 1910 and 1917 in the early lamb-producing States was due primarily to competition with other farm enterprises and to the continued depredations of dogs. Cattle, hogs, and in many localities, dairying were sharply competitive with sheep. There was a tendency for sheep to give way before other live stock in the richer, more level areas and to move onto the adjoining more hilly lands. The same factors which made for cheapness in lamb production favored other live stock almost as much, while canine depredations were inimical to sheep. The recent rise in price of sheep and wool (and to a less extent the strengthening of the dog laws) encouraged the producers to increase their flocks. Most growers in this part of the region reckon that the wool clip pays their production costs, the item of summer pasturage being overlooked. With such prices as have prevailed since 1916, it was felt that animals which yielded so large a net return had a real place as a secondary enterprise even on the higher priced lands.

Outlook in Mountain Sections.

In the mountains and less favorable areas of this region sheep continued to decline for the same reasons as before 1910, but such factors as the steadily rising prices for stock ewes and for lambs during the last four years, the slow adoption of good rams, which enhances the value of the resultant flocks, and the revision of the dog laws, have operated to stimulate sheep husbandry in such sections. Good stock ewes have in late years cost early lamb producers as much or more than they receive for their lambs, but have been extensively purchased in order to save a year's grazing.[4] Growers of such ewes in the rougher areas have profited largely by the rise in price, as well

[4] In recent years a steadily increasing percentage of stock ewe purchases has been black-faced animals from the Middle West, and crossbred range ewes from the far West. The latter are very popular where existing prejudices against other than dark-faced sheep have been overcome by a year's trial of these heavy shearing, sturdy, range animals.

as from sales of their wether lambs, though wool production is more important in their flock receipts than in the early lamb areas. In parts of West Virginia the thinner lambs from mountain pastures, where internal parasite infestation is at a minimum, are now being used in some localities for feeders in the valleys. This outlet has enhanced the value of such lambs when castrated and of acceptable type. The problem confronting the producers in mountain areas in general is more extended breed improvement, docking, and castration of the males. Sheep undoubtedly will continue to be a secondary enterprise in such localities, with relatively low costs, and wool secondary to other receipts. Growers in these rough localities who have been in a position to adopt early lamb production have profited nearly as much thereby as have the shepherds in the older producing areas. In the mountains sheep husbandry should continue to grow at a conservative rate.

Outlook in Piney-woods Areas.

In and adjacent to the piney-woods belt, sheep have continued to decline—except for local increases in western North Carolina, west central Alabama, and Louisiana. In western North Carolina early lamb production has been making relatively good progress.[5] In central Alabama—the old "black belt"—recent large increases have occurred as the result of adoption of sheep by northern farmers who have settled in that area and engaged in live-stock production. The sheep are nearly always a secondary enterprise on these rich limestone lands, and the same system of management is followed as in the early lamb sections. This area, which extends into northeastern Mississippi, is rapidly developing into as good an early lamb center as central Tennessee and Kentucky. The recent increase in Louisiana has been the result of large and small growers awakening to the real value of sheep and to some improvement in type kept and in management. Larger net returns have thus been secured. The Arkansas increase appears to have taken place chiefly in small flocks. In southeastern Georgia and parts of Florida local increases in number of sheep have occurred and some improvement of type, as in Louisiana, but until a year ago high prices offered for stock ewes and for all sheep in general resulted in a steady decline in most piney-woods areas. This was largely halted by the summer of 1919, when the owners had generally awakened to the real value of their sheep. Many then started to rehabilitate their flocks by local purchase.

[5] Part of the North Carolina gain has resulted from production of early lambs of good type to supply the tourist demand. In a few other localities a similar activity has developed, but such production is of negligible importance, as yet, in the seaboard States as a whole.

Changes in Management.

In the piney-woods belt it would seem that the decline in number of sheep has been halted. The larger landowners, who have also been the sheep owners, are awakening to the necessity of better management[6] if their flocks are to continue in existence in the face of multiplication of the enemies of sheep on the remaining open ranges. The desirability of type improvement has also become recognized. Although both Down and Rambouillet bucks, when turned onto the open range with the ewes, have often weakened and died before any benefits were secured, in numerous other instances they have doubled the wool clip in the first cross, besides making marked improvement in the carcass. The best results along this line appear to have been secured in parts of Louisiana and Florida.[7]

With the high prices of recent years, men who have modified the traditional system somewhat have been selling a part of the older wethers, rams, and occasionally ewes, more or less regularly, but often have maintained the size of flock. Ewes constitute about two-thirds of such flocks, the receipts have been far higher than from wool sales alone, and the costs, already nearly at the vanishing point, are little greater. The slow adoption of change in methods seems to assure a conservative increase in number of sheep in piney-woods areas in the near future. The system is such that the costs are reduced to a minimum, but with receipts from wool becoming subordinate to receipts from lamb and mutton.

Outlook in Early Lamb Sections.

In the more level parts of the older early lamb sections, where sheep have had a tendency to give way before hogs and cattle, the situation is somewhat less promising. Cattle which have been car-

[6] More than the traditional care, practically at lambing, to protect the flocks from the more serious cause of loss is now being adopted by many of the more farsighted sheep owners. If possible, they graze the sheep on fenced fields while the lambs are being dropped and greatly increase the percentage of lambs raised. Often the hogs are penned up at that time and sheep left on the range. The percentage of lambs raised under the traditional system of management varies from zero to about 60 and averages approximately 35. It has been decreasing slightly in recent years with the growth of settlement by small farmers and the attendant increase of hogs and dogs. These newer settlers have rarely adopted sheep owing to lack of capital and the meager returns from small flocks. Where the hogs are penned up at lambing time the percentage of lambs raised is nearly doubled. Where the sheep are grazed on fenced areas at this season the percentage raised to the time they are turned onto the open range is often more than doubled, and has been as high as 100 where winter cover crops are used. Under the traditional system, with few or no sales from the flock other than wool, the ewes constitute a little less than one-half of the sheep.

[7] In the flock at the Mississippi Agricultural Experiment Station the average weight of the native piney-woods ewes was 65 pounds and the wool clip 2¼ pounds in 1918. The first cross yearling ewes averaged 81½ pounds in weight and the clip 5¼ pounds. These were sired chiefly by Down bucks. The native lambs at five months of age—the season when the cut-over forage is about at its best—were of indifferent quality and averaged only 45 pounds in weight. They brought 12½ cents per pound on the St. Louis market. The first-cross lambs were of good quality, averaged 65 pounds at the same age, and brought 17½ cents per pound. These are typical spreads in weights and prices for the native and improved sheep and lambs of these areas.

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CONCLUSION.

In the South, sheep husbandry is distinctly a side line in agricultural production. In the Virginias, Kentucky, and Tennessee, where 70 per cent of the regional sheep were located in 1910, 16 per cent of the farms carried sheep.[9] In the other parts of the region this percentage was only 2.8, and a majority of the animals were run virtually on open range, as an incident in agricultural production, in flocks usually of several hundred head or more. The animals in the piney-woods belt were in the ownership of so few men, however, that small scattered flocks elsewhere in the seaboard and Gulf States reduced the average size of a flock to 20 head of shearing age. In the early lamb States named just above the average size of flock was practically the same, and the majority contained less than 40 animals of shearing age. The size of flock in these States indicates the secondary importance attached to sheep husbandry. Over 90 per cent of the sheep of shearing age were ewes, and 76 per cent of the total flock receipts were derived from lamb and sheep sales in the Virginias, Kentucky, and Tennessee; i. e., only 24 per cent came from wool. This percentage is more nearly comparable with the relative unimportance of the wool clip in Great Britain than is the case in any other part of the United States. In the balance of the region 49 per cent of the reported flock receipts came from wool, but sales of sheep by men going out of sheep husbandry, principally in the hilly sections, obscured the normal preponderance of wool in the flock receipts in tidewater areas.

In the South, as in the East, the existence and importance of wool growing is conditioned principally by the profits of sheep husbandry as compared with other farm production. With the development of other enterprises more remunerative as major activities, sheep have become a side line in which wool is of secondary importance outside of the piney-woods belt. In this section wool is becoming of secondary importance, while production costs are at an irreducible minimum. In certain areas of the South the chief problem is more extended breed improvement to enhance lamb and stock sheep receipts. In the South as a whole, wool-production costs are lower than in any other region in the United States. Competition with foreign wool would appear to be of less importance.

[9] U. S. Census, 1910, vol. 5, pp. 68ff., 402ff., 502–3, 528.

Chapter 6.

THE SHEEP INDUSTRY IN THE MIDDLE WEST.[1]

HISTORICAL BACKGROUND—TARIFF INFLUENCE.

Sheep were relatively unimportant west of Ohio prior to 1840. A rapid adoption of wool production thereafter quickly reversed the status of the industry in the region as a whole. Wool could be grown for practically half as much per pound as in the East. Between 1840 and 1850 economic conditions swiftly changed to favor the sheep industry, and the western producers rapidly increased their flocks. Although keen competition with other agricultural enterprises after 1850 slowed up the increase in number of sheep in the West until immediately after 1860, the industry steadily extended with the movement of settlement into newer areas. During the Civil War period a marked gain in demand for wool, and more favorable wool prices as contrasted with prices for other agricultural products, resulted in a very rapid growth of the sheep industry throughout this region. This growth consisted almost entirely of Merinos. The country-wide period of readjustment between 1867 and 1871 eliminated a large proportion of the animals between Ohio and the Mississippi River. West of that river continued extension of settlement resulted in a fairly steady increase in number of sheep until 1893. On the other hand, between Ohio and the Mississippi River the number of sheep continued to decline fairly steadily after the postbellum period of readjustment. Finewool sheep could not compete with other live stock enterprises and with grain production in most of this older part of the West. The chief exceptions were parts of southern Michigan and southern Wisconsin. During the nineties a marked reduction occurred throughout the region, and large numbers of Merinos were shipped to the ranges of the far West, particularly from Michigan and Wisconsin. Subsequent gains in number of sheep east of the Mississippi River fell far short of correcting this decline. West of the Mississippi River, however, subsequent growth of agricultural settlement and adoption of more diversified farming facilitated an increase in number of sheep which practically nullified the decline of the nineties. In this region as a whole the economic weakness of a finewool sheep industry, save in a few areas where conditions particularly favored the Merino, was

[1] Indiana, Illinois, Michigan, Wisconsin, Minnesota, North and South Dakota, Nebraska, Iowa, Missouri, Kansas, and Oklahoma.

demonstrated to the shepherds by the period of free wool during the nineties. The changes in number of sheep are shown in detail in the following table:

TABLE XXIII.—*Number of sheep* [a] *in the Middle West, 1840–1910.*

[000 omitted.]

State.	1840	1850	1860	[b] 1867	[b] 1871	[b] 1884	[b] 1893	[b] 1897	1900	1910
Indiana	676	1,122	1,023	3,034	2,100	1,145	1,080	655	1,011	812
Illinois	396	894	803	2,764	1,424	1,127	1,187	604	629	659
Michigan	100	746	1,320	4,029	3,073	2,412	2,519	1,342	1,626	1,545
Wisconsin	3	125	345	1,664	1,056	1,336	1,198	709	986	629
Minnesota	.....	.....	16	120	140	275	500	405	359	452
Iowa	15	150	281	2,399	1,823	[c] 497	791	554	658	770
Missouri	348	763	1,034	1,006	1,578	1,439	1,100	697	664	1,116
North Dakota	.....	.....	.....	.....	.....	182	390	356	451	241
South Dakota	.....	.....	.....	.....	.....	.....	324	336	507	501
Nebraska	.....	.....	2	21	27	334	273	189	336	240
Kansas	.....	.....	19	108	115	822	390	222	180	204
Oklahoma	.....	.....	.....	.....	.....	.....	.....	23	49	49
Total	1,538	3,800	4,843	15,155	11,336	9,569	9,752	6,092	7,456	7,218
Total United States	19,311	21,723	23,977	39,385	31,851	50,627	47,274	36,819	39,853	39,644

[a] Sheep of shearing age, though some lambs probably were included in certain of the census years.
[b] Estimated.
[c] The estimated number in Iowa was not properly revised for a number of years following 1871, and then, perhaps, was revised too drastically. The surprising decrease shown in the table is perfectly reasonable in view of the pronounced increase in other live stock. Milch cows rose from about 345,000 head in 1871 to slightly over a million in 1884, other cattle from 599,000 to nearly 2,000,000, and hogs from 1,666,000 to almost 5,000,000 head.

Change in Type of Sheep Kept.

A modification in breeding was adopted in the West after 1870. The change became more rapid after 1880, and especially fast during and after the nineties. Some mutton blood had been used before the Civil War, but its popularity was quite local until the seventies. Then a steadily accelerated use of mutton crosses on the prevailing Merino foundation set in, and the longwool breeds were first adopted. Growers working away from the Merino went to the opposite extreme in size. They desired an animal which would mature to a heavy weight in answer to the demand for mutton. While size was the dominant purpose, they also desired heavy shearers, the fleece poundage of the Merino being never lost sight of. As the use of this cross continued, however, and the fleece lost more and more of the original Merino density, it was discovered that these openwooled animals were not well adapted to the Middle Western environment, with its violent climatic changes. The cold, chilling rains of spring and fall seriously affected the health of such sheep, while the intense heat of the summer was very hard on animals carrying such heavy external body fat as characterized the longwools. An important factor in this lack of adaptability was the method of management followed. The sheep continued to be handled just as had the Merinos and foraged for their feed throughout the greater part of the year. Any shelter furnished in bad weather was usually of a very indifferent

nature, and was especially inadequate during the rainy periods of spring and fall. Even the windbreaks now so prevalent in the prairie States, which would have furnished some shelter both from rain and intense heat, were largely nonexistent. The openwooled sheep were therefore at a severe disadvantage at the time they were generally tried out. A further objection to the longwools was the preference of the consuming public for better marbled mutton than these sheep furnished. Accordingly a change was made to the Down breeds for crossing on the Merino.

At first the Southdown was widely used, but they also quickly lost their popularity. Unlike the longwools, their short wool did not lengthen the fiber in the resultant crossbreds, and their light fleeces rapidly resulted in a marked loss in density of wool covering. At the same time, the grade animals from a continuation of this cross became nearly or quite bare on the belly and inside of the thighs, thus further decreasing the wool clip. Other Downs, principally the Shropshire, were then used. During the eighties this breed was somewhat larger and coarser than it became after a generation of refinement in breeding. The Shropshire more nearly than the Southdown approximated to the size desired by the farmers. The characteristic fleece density and extent of covering of the Merino was largely retained in the Shropshire crossbreds, and the length of staple more closely approximated that of the Shropshire sires. Therefore this breed was rapidly adopted for the development of mutton flocks throughout the Middle West after the early eighties. The shepherds desired a general purpose sheep which would require a minimum of attention. The development of the market for lamb coincided with a steady refinement of the Shropshires which fitted them more and more for the production of desirable, fairly rapidly growing lambs in a somewhat "rough and ready" system of management.

Development of the Delaine.

Another change in breeding of large importance locally, particularly in Michigan, was the development of the Delaine type of Merino. This really began before the Civil War, but was of relatively small importance until the postbellum period. The smooth-bodied Delaine grew a longer, more desirable fleece than the older, wrinkly type, and also represented a considerable improvement in size and mutton quality of carcass. They became very popular after the price of wool declined in the eighties, and were adopted in the rougher sections favorable to a continuance of sheep as a major enterprise on the farm. Subsequently this type was largely bred out by Down crosses, except in a few rather restricted areas, where for a time the Rambouillet became the chief competitor of the Delaine. This Merino type was

developed chiefly in France and Germany with more emphasis on carcass weight as well as fleece weight, and became fairly popular in this country during and subsequent to the nineties. It also was later practically bred out by Down crosses in the Middle West, though it never secured a strong foothold in commercial flocks. Breeders of purebreds of both these types have been able to survive fairly well, because of the demand for stud Delaine and Rambouillet sheep in range flocks.

Coincident with the change in breeding, the sheep industry in most parts of this region, just as in the East, steadily became more and more of a secondary enterprise in agricultural production. In the case of the Middle West, between 1871 and 1893, however, this altered importance was indicated more by the rapid increase in other lines of production than by an actual decline in number of sheep. The region as a whole became more intensively farmed. As the revenue from the industry became of less relative importance to most operators keeping sheep, the percentage of such revenue derived from wool also declined. This was due to the emphasis placed first on mutton, then on lamb production, and to the increasing proportion of flock receipts coming from mutton and lamb sales.[2] Receipts from wool thus became of secondary importance in an enterprise which itself became of distinctly secondary importance. Wool production thus came to be less affected by competition with foreign wools.

Present Status of Sheep Husbandry.

At the present time, save in a few areas, sheep in the Middle West are distinctly a side line in general farming. The chief exceptions are in the western part of the region[3] where relatively large flocks or bands are often kept under conditions sometimes similar to the ranges of the far West. Elsewhere the flocks are more numerous and average somewhat larger than the usual size in areas with sufficient broken or hilly land to necessitate the retention of more than the usual amount of permanent pasture. Parts of southeastern Iowa,

[2] This decrease in relative importance of wool was not appreciably affected by a change in the relative value of fleeces with the steady disappearance of wethers as the switch to lamb production developed. Wether wool is practically always more desirable than wool clipped from breeding ewes because wethers are hardier and withstand periods of hard living far better than pregnant or nursing ewes. There is a logical effect on the weight and quality of fleece. Any deterioration from this cause, however, has been more than offset by breed improvements which have resulted in a steady increase in average weight of fleece despite the disappearance of wethers. In 1870 the average clip per head in the United States was approximately four pounds; in 1890, 5; in 1900, 6; and in 1917, 7 pounds. Regional changes have been in about the same proportion. It may be noted here that, quite apart from increases in average weight of fleece, flocks of breeding ewes raising lambs to be marketed at five or six months of age really produce more wool than wether flocks of similar size. An ewe shearing 6 pounds of wool corresponds to a wether shearing 8 pounds. The lamb of this ewe at 5 or 6 months old carries about 3.5 pounds of wool. The lamb, if given better feed and care and marketed a month earlier, carries the same weight of fleece.

[3] Parts of western Kansas, Nebraska, North and South Dakota, and Oklahoma.

northeastern Indiana, and southern Michigan are the chief examples. In such localities the Delaine type of Merino has sometimes been retained in considerable though steadily decreasing numbers. Sheep are more important than elsewhere in the bean-growing area of southern Michigan, for the same reasons as in western New York.[4] In the region as a whole, the Down type, principally the Shropshire, largely prevails. Considerable use is often made of crossbred ewes from the ranges of the far West, but these are practically always bred to a Down buck. The animals are relied upon to clean up the cultivated fields, fence rows, and odd corners, and to consume in winter a part of the unsalable roughages. Aside from their use by men with flocks of purebreds, special forage crops for sheep are almost unknown.

FLOCK MANAGEMENT.

The lambs are not usually dropped until or shortly before the pastures have made a fair growth in the spring, in order to avoid the extra feed and care necessary if they come earlier. Owing to the absence of the rank growth which characterizes winter grain in the more southern areas, relatively little use is made of such fields for winter and early spring pasture north of Missouri. The lambing season thus varies from about the middle of February in southern Missouri, where use is made of winter grain for pasture, to the first or the middle of May in northern Wisconsin and Michigan. When the young are dropped in sheds or barns and the necessary feed given until the pastures are sufficiently advanced, the lambing is about 30 days earlier than otherwise, but this practice is followed in but relatively few instances. Approximately 75 per cent of the native lambs are marketed from grass after the 1st of September. As in the East, they thus compete with the peak of the range run, when prices are at their lowest level and returns to the producers are correspondingly depressed. Shepherds who breed to lamb early and to market their products between the latter part of June and about the middle of August constitute a relatively small percentage of the total. Such men are satisfied that the extra feed and care pay, even though their early lambs compete with those of the section south of the Ohio River. Receipts from wool sold form a smaller part of their total flock receipts than is the rule. These men are the more careful shepherds who breed better sheep and give the flock adequate attention. Their lambs, from good sires and with a little more than the prevailing feed and care, shipped at 4 to 4½ months of age, usually weigh from 60 to 70 pounds and are of very good quality. When grazed on clover or alfalfa and fed grain in creeps,[5] such lambs reach

[4] Chap. 4, supra.
[5] Moveable hurdles through which the lambs can pass, but which hold back the ewes.

the desired weight approximately a month earlier. The costs are then higher, but the early lamb market is at its best when the lambs are shipped. By having their lambs come early—in a shed or a corner of the barn—and "crowding" the lambs, the bulk of the labor for sheep is done before spring work becomes pressing and when danger of parasite infection is reduced to a minimum. The growers who operate thus differ markedly from many in the region who look upon sheep simply and solely as scavengers and neglect them and the lambs to such a degree that net flock returns are almost negligible.

In contrast to the better quality of the early market lambs, after the 1st of September there is a general decline in condition. The males (unaltered and usually undocked) become, in a steadily increasing proportion, coarse and "bucky" (develop the sex instinct) as the season advances, and as a result of their constant worrying the quality of the females is lowered considerably. The weight of lambs often is greater, but this is far more than offset by the poorer quality of carcass and depressed dressing percentage. A majority of the more acceptable lambs, which reach the market during the latter part of the native run, normally come from the more northern areas, where cool nights and more succulent herbage after midsummer are a distinct advantage. Returns to the producers are seriously lowered by the large percentage of inferior native lambs, as is the proportion of total flock receipts due to sheep and lamb sales as against sales of wool. It has been estimated that as high as 75 per cent of the native run after September 1 are lambs which, on the basis of 1919 prices, sell at $1 to $5, and in extreme cases even at $7, below the price of good natives; i. e., from 7 to 50 per cent lower in most of September, 1919. The average price depression appears to be about 15 to 20 per cent below native "tops." The price of all lambs marketed at this time is depressed by this flood of native culls, as is the reputation of lamb meat in consuming centers. This item of cull lambs and concentration of market receipts is the chief weakness in the sheep husbandry of the Middle West.

Outside of some areas in Michigan, relatively few hothouse lambs are produced, and a large proportion of those from Michigan are marketed in New York City. The percentage of the regional clip which comes from such flocks is negligible.

RECENT NUMERICAL CHANGES.

During the past four years there has been a slow increase in the number of sheep in this region. The change in numbers since 1910 is shown in the following table:

TABLE XXIV.—*Number of sheep in the Middle West, 1910–1920.*

[000 omitted.]

State.	[a] 1910	[b] 1917	[b] 1920	States.	[a] 1910	[b] 1917	[b] 1920
Indiana	812	578	663	South Dakota	501	512	607
Illinois	659	558	628	Nebraska	240	312	265
Michigan	1,545	1,232	1,495	Kansas	204	261	379
Wisconsin	629	436	464	Oklahoma	49	82	108
Minnesota	452	384	474				
Iowa	770	807	889	Total	7,218	6,205	7,235
Missouri	1,116	845	942	Total United States	39,644	35,998	36,753
North Dakota	241	198	236				

[a] Animals of shearing age.
[b] Estimated by the U. S. Department of Agriculture, as on hand January 1. Estimates are revised to the basis of animals of shearing age in the same proportion as present on Apr. 15, 1910. The above figures do not include feeder lambs on hand in the early winter and being fattened for market before or after shearing. These figures are presented solely for their suggestive value as indicating the recent growth of the sheep industry in this region.

There were 7,218,000 animals of shearing age in April, 1910. It is estimated that the number declined by 14 per cent by January 1, 1917, owing to continued competition with other agricultural enterprises (particularly with dairying in many areas) and to the effect first of the prospect, then the reality of free wool in 1913. This was largely a psychological factor, as only about one-third of the total flock receipts were derived from wool sales. The continued rise in lamb and mutton prices, and the almost immediate advance in the world market for wools similar to those of the regional clip checked the decline by 1917 in the region as a whole. The subsequent increase evidently restored the sheep industry to the 1910 status. The bulk of this increase has been due to the retention of native ewe lambs, conspicuously scant in the market receipts during most of 1918, for breeding purposes. The remainder resulted from a larger use of ewes culled from the range bands of the far West. Large numbers of these were shipped to country points from the various markets.[6]

[6] The utilization of ewes culled from the range bands of the far West, but good for two or more lamb crops on the richer grazing available in the farming States, has always been quite widespread in the Middle West. Such ewes are very popular in much of this region and produce excellent lambs when bred to good bucks. An unduly large percentage of these animals sent to country points during the past two years were already too old for further profitable breeding. Such animals often were a keen disappointment to their purchasers, who usually were beginners in the sheep industry, and to that extent discredited the use of western sheep in some localities. On the whole, however, their popularity appears to have been extended and western stock sheep, due to their comparative freedom from disease during the remainder of their useful life, undoubtedly will continue to furnish a considerable proportion of the breeding stock in the sheep industry of the Middle West as long as they are shipped in considerable numbers from the ranges of the far West. If at all desirable, and normally few but desirable ones are shipped from the stockyards, they shear well, are excellent mothers, and with a good buck they produce excellent lambs. As a rule they are now purchased for about the same amount as is secured for a good lamb and they are often more desired by producers than native ewes. Surplus western yearlings shipped after shearing from ranch or feed yard and then sold for breeding purposes are quite popular but the number of such animals available is relatively small.

Types Involved.

Coincident with the increase in number of sheep there have been appreciable gains in quality of animals kept and of a part of the lambs marketed. As in the East, the use of purebred Down bucks has become more widespread in recent years, and in general a better appreciation of the value of well-bred sires has developed. The pronounced rise in lamb prices has also accentuated a desire for larger, more robust breeding stock, with logical increase in demand for animals of the larger Down breeds. Such demand has been especially marked from shepherds producing lambs to be marketed before the middle of August. In fact nearly all of the improvement in quality of lambs noted at the stockyards appears to have been made by these more careful farmers. Their lambs are of better quality and reach the market earlier than was the case six or eight years ago. Although the average weight of "grass" or "milk" lambs raised in this region has shown a marked gain during the past 10 or 12 years—estimated at as much as 10 pounds per head by one of the largest sheep buyers on the Chicago market—the more recent improvement has been in quality and somewhat earlier readiness for market, rather than a gain above the "handy weights" desired by the packers. The percentage of the lambs so marketed is no higher than previously, but in view of the 14 per cent increase in number of sheep during the past four years, the fact that the same percentage of good early lambs is marketed would suggest either an increase in number of shepherds engaging in that phase of the industry or an enlargement of the flocks producing such lambs. On the other hand, the later part of the native run shows no appreciable betterment in quality. On the whole, until wool prices became unduly enhanced, as compared with lamb and mutton after 1915, the proportion of total flock receipts derived from wool would appear to have been slightly decreased.

The disproportionate rise in wool prices for 1916 to 1919, inclusive, had the same effect as in the East. Breeding stock of larger size was somewhat more in demand, as it was believed that they would shear more wool. Much more attention also was paid to the extent of fleece covering and the quality and length of staple. This has greatly encouraged the more widespread adoption of purebred rams. An improvement in method of fleece preparation which had been progressing somewhat slowly for many years was accentuated. The use of sisal twine for tynig the fleece decreased, and more care in shearing and in sacking without dung locks or other refuse became the rule. There has also been a pronounced growth of cooperation in wool sales, either at local points or by consignment to commission houses at market centers. When attended by grading

of the fleeces at country points to show the producers the cause and expense of producing low grades, the stimulus to betterment has been largely strengthened. The net result of this has been to offset prior neglect of the wool clip.

In some restricted localities there has been a tendency toward a return of finewools of the Delaine type as a result of the high price of wool, more especially with the abnormal price of fine fiber in 1919. Many breeders of such sheep, who previously found their market in the Southwest, have disposed of their stud animals in parts of the Middle West. This tendency has been largely confined to the southeastern Iowa section and southern Michigan. Where the topography is less rugged, and the previous crossbreeding has largely eliminated finewool blood, it is possible that this return to the Delaine type may prove a change of doubtful value, as the Downs replaced the finewools in such localities because the latter were deemed less profitable. In the rougher localities, where there has been only a partial replacement of finewools by the Downs, this criticism is not so generally applicable, because the Delaine type of Merinos has persisted as a result of its inherent foraging and disease resistant qualities.[7] The lambs from such flocks are extensively used for winter fattening in or near such localities, and finish to very desirable weights. Their quality as fed lambs is high, and they are popular for fattening because of the heavy fleece normally shorn before sale in the spring.

Outlook for Permanence of Recent Increase.

A continuance of the recent increase in number of sheep in this region is subject to the same deterrent factors which apply in the East. High prices of all agricultural products are the rule, and in the greater part of the region sheep are subject to as keen competition from other farm enterprises as ever. The cost of fencing on farms not already fenced with woven wire is of less importance than in parts of the East, because of the richness of the soil, but unless an operator is also undertaking more extensive hog production, either alone or in connection with steer feeding, it is not practicable to erect woven wire just for sheep in small permanent flocks. Depredations by dogs have strongly discouraged many men from adopting sheep raising. Ignorance of sheep management has had the same effect. Some operators with no previous experience have put on sheep of good type in relatively large flocks and lost heavily. Such instances have had considerable local effect in discouraging others from embarking in the enterprise.

[7] This item is presented in some detail in the following chapter.

On the other hand, recent changes in the dog laws of many States have helped remove this menace to the flocks, while persistent efforts on the part of educators, and sensible adoption of small flocks with which to secure the necessary experience for profitable management, have operated steadily to correct the rather widespread ignorance of sheep husbandry. At the same time, the use of woven-wire fencing is gradually becoming more general throughout the region, thus tending to eliminate a factor strongly inimical to the adoption of sheep. In some localities, owing to labor scarcity and to what were deemed to be unprofitable prices, sheep have recently displaced dairy cows to an appreciable extent. Some men have come to the conclusion that it is easier and relatively cheaper to secure a well-bred flock than to develop and maintain a high producing dairy herd, and that the net returns from sheep are satisfactory and the labor question far less pressing. It is open to question whether such replacement will prove permanent other than in localities where conditions remain distinctly favorable to sheep.

Realization of Sheep Values.

Then, too, it is becoming generally recognized throughout the Middle West that the sheep is a farm animal. The belief that a flock of moderate size has a legitimate place on most general farms is becoming prevalent. Flocks have been adopted with good results on some of the distinctly prairie farms previously devoted entirely to grain, beef, and pork production.

The fact that, in spite of the recent increase in number of sheep, as large a percentage of the lamb crop as ever reaches the market during the most profitable season and with somewhat better quality, would suggest that the industry as a whole has made a perceptible advance along more remunerative lines. At the same time the increase in number of sheep has been chiefly in medium-sized flocks. The operators have adopted them on the scale best suited to an enterprise which is distinctly a side line, and only to an extent favorable to their continuance.

In this connection it should be noted that the shepherds in the fleece-wool States are now very favorably situated with reference to competition from the range sheepmen of the far West. One reason why sheep decreased so rapidly east of the one hundredth meridian was the cheapness of wool production on the open ranges. Range competition in lamb production was later believed to be inimical to profitable sheep husbandry on the farm. In range areas, however, steadily increasing production costs have wiped out any advantage which the sheepmen formerly held. In 1918 agents of the Tariff Commission ascertained that the total expense per head of sheep (including interest at 6 per cent) averaged $7.94 for the representative range outfits from which cost data were secured. The

profit per head averaged 85 cents. The calendar year 1918 was fairly profitable for the range sheepmen. Data[8] collected in Indiana for the calendar year 1919, when conditions were more favorable than normal, showed a total expense in 20 representative flocks (with interest at 6 per cent included) of $8.19 per head, receipts $10.35, and a net profit of $2.16. Wool receipts averaged 38.5 per cent, as against 48 per cent on the range in 1918.

Cut-over Land Developments.

A factor of some importance in the recent increase in number of sheep has been the utilization of parts of the "cut-over" areas of Michigan, Wisconsin, and Minnesota. Summer pasture in the less densely brushed hardwood sections of the above States is abundant. The main problem is winter feed. The recent drought in the far West resulted in large numbers of sheep being shipped in to utilize the surplus summer feed, but in many instances the animals were run on unsuitable areas and did not do well. The owners then sold large numbers of ewes to local farmers rather than ship them to market with the lambs. By this means many flocks have been started by settlers anxious to hasten the debrushing of their land, but who previously had been unable to buy sheep. During the past two years thousands of head have been secured from range bands grazed on cut-over lands.

A number of companies have lately been formed to develop sheep husbandry on an extensive scale in certain of these areas. A few who have endeavored to keep sheep without previous provision for hay and with only a limited amount of grain for winter feed have lost heavily through flock casualties or because large purchases of feed had to be shipped in to carry the sheep until spring. Others have first cleared sufficient land for necessary hay and grain production. Their operations should result in further local increases in the near future. During 1919 the number of flocks in North and South Dakota was also somewhat increased by purchases of stock (breeding) ewes from the drought areas.

Until the wool market collapsed in May, 1920, and the subsequent depression in the lamb market, it seemed that, on the whole, at least a part of the recent increase in sheep in the Middle West would be permanent, and that in some sections there would be a further conservative gain in numbers. Developments in the wool market, in connection with the effect on the sheep market of importations of frozen lamb for the account of the British Government, will considerably affect the number of sheep carried through the winter of 1920–21.

[8] Loaned by the Extension Department, College of Agriculture, Purdue University Revised to eliminate credit for manure as being offset by labor of feeding the sheep. Other labor charged at the Indiana rate. The cost of growing the wool of these flocks was about 41 cents per pound in 1919. It was grown under favorable conditions owing to the mild winter and relatively low feed costs.

CONCLUSION.

In the Middle West the sheep industry has become distinctly a side line in general agriculture. In 1910 only 13 per cent of the farms reported sheep, and the average size of flock was only 28 animals of shearing age.[9] The sizes most commonly noted were approximately 20 to 40 head east of Kansas, Nebraska, and the Dakotas, where the flocks are considerably larger. In the western part of the region ewes constituted about 80 per cent of the sheep of shearing age, but eastward the percentage was slightly above 90 save in Iowa, where some feeder sheep and lambs lowered the average. The small percentage of farms carrying sheep, and the small size of flock, indicate the secondary importance of the sheep industry in the region as a whole. The preponderance of ewes suggests that the bulk of the flock receipts came from mutton and lambs sold or slaughtered. As a matter of fact, the proportion of the flock receipts derived from sales of wool was slightly more than one-third. The reported percentage was 33, but sales of fed western lambs disposed of before shearing affected the real figures. The proportion due to wool sold would have been smaller but for the fact that approximately three-fourths of the lambs are marketed during the period of lowest prices, and with a high percentage of culls to depress lamb prices still further.

Later breed and type improvements have operated to increase the number of lambs marketed at higher prices during the earlier part of the native lamb run, but the percentage of such lambs in the total native crop has increased little if any. The general quality of the native lambs has not increased appreciably, though the greater rise of lamb and mutton as contrasted with wool prices prior to 1916 operated to decrease the percentage of total flock receipts derived from wool. The recent course of wool prices has effected further breed improvements along the same lines as in the East. It is interesting to note, in spite of the much more recent abandonment of the old Merino ideal as to fleece poundage in the Middle West, that the Down has been the model chiefly in mind in fleece betterment during the past three years. The net result has been further improvement in type of sheep kept, but the permanent gain will be more manifest in the quality of the lambs marketed from the better bred flocks and the receipts therefrom than in the returns secured from the slightly larger and more desirable wool clip.

On the other hand, the importance of the wool carried by sheep and lambs sold unshorn—and probably 95 per cent of the native sheep and lambs sold in the region are so disposed of—must not be lost sight of. This pelt wool is valued highly by the packers and

[9] U. S. Census, 1910, vol. 5, pp. 68 ff. 402, ff. 502-3, 528.

contributes largely to the gross return of their sheep departments. Sheep and lambs disposed of in the early fall carry practically half a year's growth of wool. Lambs forced for the early or midsummer market carry about the same weight of fleece as those marketed a month or two later. Data, gleaned from the Chicago market reports for 1912–1914 inclusive, show that newly shorn "plain" to "top" western and "native" or fleece states fed lambs, marketed between about March 25 and May 15, averaged 13.1 per cent lower in price per hundred pounds live weight than similar unshorn lambs. In other words, the value of the fleece carried by unshorn lambs represented 13.1 per cent of the price paid per hundred pounds. From 1915 to 1919, inclusive, similar shorn fed lambs averaged 17.4 per cent less in price per 100 pounds than those unshorn, i. e., the wool on the unshorn lambs represented 17.4 per cent of the price paid for them by the packers. In the spring of 1920 the value of the fleece dropped to approximately the 1912–1914 ratio, but fell somewhat below when the wool market broke after the middle of May. It is highly improbable that less than the 1912–1914 ratio will prevail after the wool market becomes stabilized.

The above simply means that, on the average, shepherds in the Middle West from 1912–1914, instead of getting approximately 33 per cent of their total flock receipts from wool really derived about 40 per cent, owing to the effect on sheep and lamb prices of the value of the fleece carried by sheep and lambs sold in the fall. Between 1915 and 1919 they really secured 46 per cent of their total flock receipts from wool instead of approximately 38 per cent. With what seems to be a return to prewar ratios between wool and mutton and lamb prices, the effect of breed and management improvement on flock receipts should be about 50 per cent stronger with respect to the real returns from mutton and lamb as against total returns from wool, i. e., in the ratio of 60 to 40.

However, the presence and continuance of wool production in the Middle West are controlled chiefly by competition between sheep husbandry and other farm production. This competition has forced sheep to become of distinctly minor importance on nearly all farms in this region. Wool sales are subordinated to sales of lamb and mutton. An extension of the minor modifications in flock management already made by many of the producers, with advancement of the period of lamb marketing, will do much to solve the problem of lamb prices. This constitutes the chief problem of a large majority of the shepherds. Competition with foreign wool producers is less important.

Chapter 7.

THE SHEEP INDUSTRY IN THE OHIO REGION.[1]

HISTORICAL BACKGROUND.

In this region, as in the Middle West in general, sheep were kept mainly for local wool supplies until about 1840. Improved transportation facilities and much lower production costs enabled the shepherds greatly to increase their flocks immediately thereafter at the expense of the East. Competition with other farm enterprises caused a small reduction between 1850 and 1860, but the favorable sheep and wool prices of the Civil War period in comparison with prices of other farm products caused the number of sheep kept to increase almost 100 per cent. The subsequent period of readjustment forced a pronounced decline, but the number retained was larger than in 1860 and continued to increase until the eighties. In this region wool production was deemed profitable at the prices secured.

A small or negligible part of the decline in wool prices in the eighties was due to the slight revision in the tariff of 1883. By far the greater part was the result of rapid gains in the world's supply, particularly of Merino fiber, which directly competed with the clip of this region. Some finewool producers were forced into other activities by these declining wool prices. At this time the smooth-bodied Delaine type of Merino, with a longer and more desirable fleece, developed in this section with some regard for mutton conformation by growers desiring more income than could be secured from the American Merinos, began to displace quite rapidly the smaller, wrinkly type.

Decline of Sheep Industry in the Nineties.

During the nineties there was a decline of 46 per cent in the number of sheep in Ohio, and a corresponding loss in the balance of this region. Free wool was one of several contributing factors. An epidemic of stomach worms had some effect on the decline in number of sheep in the finewool region, as had a short hay crop in Ohio in

[1] For purposes of comparison between census and estimated figures, the statistics in this chapter are for sheep in Ohio. The finewool section of the Upper Ohio Valley, however, includes the Panhandle of West Virginia, and southwestern Pennsylvania, as well as most of central and eastern Ohio. Formerly, it also included a few counties in southern Michigan. Western Ohio is similar to the Middle West in its sheep husbandry.

1895. Following the panic of 1893, however, a general and serious depression prevailed in all lines of business and industry. Wholesale prices for farm products averaged approximately 24 per cent lower from 1894–1897, inclusive, than from 1885–1893. Boston wholesale prices for brook-washed, fine, medium, and coarse Ohio wools averaged 38 per cent less for the clips of 1894–1897 than for the preceding nine years.[2] Brook-washed, finewool fleeces were sold by the growers for 12 to 15 cents per pound during the middle nineties, and unwashed for 10 to 12 cents. Fair to good sheep sold by thousands for 50 cents to $1.25 per head, somewhat higher prices often being paid for the best wethers. Large numbers of sheep were shipped into the Rocky Mountain region. The wrinkly Merinos figured more prominently in this decrease than the Delaine type, and during and after the nineties there was a striking drop in production of the "Picklock" and "XXX" fleeces for which the finewool region had been justly famous. The following table shows these numerical changes:

TABLE XXV.—*Number of sheep in Ohio, 1840–1910.*[a]

[000 omitted.]

	1840	1850	1860	[b] 1867	[b] 1871	[b] 1884	[b] 1893	[b] 1897	1900	1910
Ohio	2,028	3,943	3,679	7,159	4,641	5,000	4,379	2,369	2,648	2,890
United States	19,311	21,723	23,977	39,385	31,851	50,627	47,274	36,819	39,853	39,644

[a] Sheep of shearing age. Some spring lambs probably included in certain of the census years.
[b] Estimated by the U. S. Dept. of Agriculture.

COMPETITION WITH OTHER FARM ENTERPRISES.

The net result of the period of free wool was to demonstrate the fact that a finewool sheep husbandry was out of place in parts of this region which were better adapted to other lines of production. This was proved by the relatively small recuperation following 1897 in spite of reimposition of the duties. The gain was limited almost entirely to the east central part of Ohio, where the broken topography favored grazing more strongly than tillage. In the other finewool areas of the upper Ohio region the gain in number of sheep was quite small. The Delaine type of Merino largely predominated in this increase, owing to its more desirable fleece and higher dressing percentage,[3] as contrasted with the wrinkly type.

[2] S. Rept. No. 1394 (1893), pt. 1, pp. 106–107; Bureau of Labor Statistics, Bull. 181 (1915), pp. 111 ff. 266; Statistical Abstract (1899), p. 427 (1915), p. 518; for a more detailed discussion of this period see the annual report, American Historical Ass'n (1918), pp. 146 ff.
[3] Proportion of dressed weight to live weight.

In the less hilly sections the raising of hogs, cattle, or dairy cows was usually adopted instead of a reestablishment or an increase in size of the flocks.

A factor of some importance in the failure of the industry to recuperate, outside of central Ohio, was the growth of coal mining and the drilling of oil wells in sections where sheep had previously been numerous and would otherwise have increased. The receipt of oil or coal royalties often tended strongly toward a decrease in agricultural production, more especially in the case of the older farmers who could afford to take life more easily than before. Cattle usually replaced sheep where mines developed, owing to canine ravages.

Cross-Breeding Developments.

A large number of producers crossed their finewools with mutton breeds, chiefly Downs, during the nineties and for a short time thereafter in order to augment flock receipts. It was found, however, that the saving of crossbred ewe lambs for flock maintenance, a practical result of such crossing, soon resulted in uneven and much less desirable fleeces. Wool production remained the chief purpose of sheep husbandry in these more hilly sections, chiefly because of the difficulty in producing grain on the steep, easily eroded fields. Even the hay crop was sometimes inadequate. Chief reliance had to be placed on grazing. Delaine sheep did much better than crossbreds on a winter feed composed chiefly of roughage, and their management and breeding were simpler than for crossbred sheep. Crossbred flocks required more feed and pasture per head than the finewools, and the size of flock had to be considerably reduced on that account. The lambing percentage from such ewes was higher and the lambs were heavier, but if the lambs were retained for one or more wool clips the size of flock had to be further reduced because of the feed requirements of these large wethers. Little more mutton was then produced than with finewools and always less and of poorer quality if the crossbreds were not well fed. The crossbred wool clip, moreover, was much smaller and less desirable than that of the larger number of finewools which could be kept on the same farm. Total flock receipts in the more rugged areas, therefore, were found to be practically as large when Delaines were kept. When operators endeavored to stock their farms approximately as heavily with crossbreds as had formely been done with finewools, the sheep did not do so well, both because of overgrazing by these larger animals and because of less resistance to parasitic infection. Heavy losses both in ewes and lambs were frequently caused by parasitic infection and flock receipts greatly curtailed. During the winter finewools could be much more closely housed without loss of health and vigor than

mutton sheep. This appears to be due chiefly to their somewhat wiry build and naturally tough constitution, as indicated by their longer life. For these reasons in the rougher sections most of the growers soon abandoned crossbreeding.

In more favorable areas where crossbreeding was continued, the growers usually maintained flocks of Delaine type by purchase from producers in less favored localities. They then bred these ewes to Down bucks and disposed of all the lambs in the fall or after fattening in the winter. Thus they avoided practically all of the difficulties attendant on cross-breeding where part of the lambs were retained for flock maintenance. Some of them raised their own ewes for breeding purposes by keeping a Delaine ram for use on a part of their females, but this was the exception. They were able to continue their more profitable system of management because of the retention of Delaine flocks by other shepherds.

Further Replacement of Sheep by Other Enterprises.

The number of sheep in the finewool region of the Upper Ohio Valley steadily decreased from 1910 until 1917. In Ohio the number declined 24 per cent. A large part of the decrease was in the east central area—east of Franklin and Delaware Counties, north of Hocking and Athens, and south of Ashland and Wayne, where sheep had remained a major enterprise on a large proportion of the hilly farms. Striking declines also occurred in many sections north and west of Columbus, and also in the area east of the Scioto River and south of the Lincoln Highway. A similar or greater decline took place in the Panhandle of West Virginia, and somewhat less in the adjacent counties of Pennsylvania. The decline was due to the drop in wool prices which began in 1910, as against the marked contemporary rise in price of other farm products. Anticipation, and in 1913 the realization, of free wool had some effect for two years, but the rise in the world wool market soon afterwards and the pronounced rise in price of finewools following 1915,[4] particularly after 1916, gave the business new impetus. Lamb and mutton shared with other products in the price rise, but their advance had less effect in the hilly areas than in more level sections, where heavier grain production made it possible to fatten more of the lambs during the winter.

Until 1917 sheep, especially finewools, decreased even in areas most favorable to them, as a result of competition with dairy cows

[4] The price received by a grower of exceptionally good Delaine wool in one of the best producing counties in Ohio for the years 1911 to 1915, inclusive, averaged 28 cents per pound, unwashed, and 77 cents from 1917 to 1919. One of the largest dealers in this region paid an average of 23¼ cents per pound for unwashed fine wool for the clips of 1910 to 1915, inclusive. The next year he paid approximately 50 per cent more. For the clips of 1917 to 1919 the price paid ranged from 60 to 90 cents, mainly 65 to 85 cents, and averaged approximately 71 cents.

and cattle. Dairying was particularly competitive with the flocks in areas not too distant from market or shipping point, or when improved roads, of which a large mileage has been constructed in recent years, facilitated delivery of dairy products to the loading platform. A marked growth of local or more distant urban, industrial, or mining markets, especially when attended by road betterments, virtually eliminated sheep in many counties except in their isolated or rougher areas, where the roads were improved but little, if at all. In these sections cattle, and in a few cases hogs, were more sharply competitive with the flocks.

In order to enhance their flock receipts, many shepherds again adopted a Down cross on their Delaine sheep. The same difficulties were encountered as previously when crossbred lambs were retained for flock maintenance. There was an increase in the percentage of growers who maintained a straight Delaine flock by breeding or by purchase, but who crossed with Downs for market lambs. More of these men appear to have bred their own ewes than previously, but the majority continued to rely on the hill areas for breeding ewes.

In the hilly sections most of the shepherds made little change in their breeding methods. Remembrance of the loss of the results secured by years of line breeding by a short period of crossbreeding, and the unsatisfactory outcome, was too vivid. They tended strongly, however, toward an increase in cattle and a curtailment of size of flocks. Hog production was sometimes adopted on farms in areas where the necessary increase in corn production greatly aggravated the serious washes so common and so hard to control when sod fields are broken. In numerous instances one year in corn on a steep hillside, which otherwise would not have been plowed, resulted in a gully which would require a dozen years to fill by natural methods. Hogs, however, have never become an important enterprise in the more rugged sections, except on occasional farms where the lay of the land was more favorable to corn growing than is the rule.

NECESSITY FOR SHEEP IN MORE RUGGED AREAS.

In these rugged sections there is a limit to the replacement of sheep by cattle. East central Ohio is a region of steep-sided, narrow-topped hills. Part of the slopes often approximate 45°. The valleys usually are narrow, and frequently are subject to spring floods which make corn production on them somewhat precarious. The hills are covered with blue grass, with considerable white clover. The latter is especially abundant where there are limestone outcrops. When weeds and brush are kept down, the carrying capacity of the pastures is high, 2½ to 3 acres per steer being reckoned on when sheep

also are kept. When sheep are not kept the carrying capacity is soon cut down considerably, especially on the most rugged farms. Cattle do not fully graze the steeper parts of the pastures, and in bad weather they always seek the lower levels, which receive most of the droppings. The fertility of the steeper slopes, in addition to depletion by natural forces, is disproportionately decreased by the grazing habits of cattle. They also eat relatively few weeds and rarely touch browse (brush growth). Fields grazed exclusively by cattle therefore soon become foul, and the carrying capacity is progressively decreased by the crowding out of grass by weeds and brush. This is especially rapid on the steepest slopes, which are then shunned more and more by the cattle in favor of the more luxuriant growth on and near the bottom land. In addition, the trampling of cattle appears to decrease the density of the turf on steep slopes, which fact hastens the incoming of weed growth in direct ratio with the grazing of such slopes by cattle. Sheep have just the opposite effect on the turf. They also graze all parts of the fields about equally, though they tend to neglect rank growth on the bottoms in favor of the shorter, sweeter herbage on the hillsides. In bad weather they seek the highest points on which to rest. They thus, as a rule, deposit their droppings where most needed and bring back to such locations a considerable proportion of the fertility previously washed into the bottoms.

Sheep also keep the fields fairly clear of weeds and brush, and if the land is not stocked too heavily, they maintain the carrying capacity on these steep hillsides to a degree not remotely possible with other live stock. Some growers maintain that almost as many animal units[5] of sheep as of cattle can be carried on the same field that for a number of years previously has carried cattle exclusively, and pasture for sheep can often be hired for a ridiculously low figure when a farmer desires to "clean up dirty fields." Sheep can also be grazed from four to six and occasionally even eight weeks later in the fall than is usually practicable with cattle. They make fuller use of surplus growth in the winter if the season is sufficiently open to permit such grazing. This applies particularly to steep pasture land. In these rough areas, therefore, there are excellent reasons for the retention of sheep in spite of low prices and enforced curtailment of the flocks.

The principal changes made by the shepherds in such areas, aside from a decrease in size of flock, were a rapid curtailment of the age to which wethers were run and an increase in the proportion of ewes

[5] The number of sheep equivalent to a cow, steer, or horse in feed and pasture requirements. This varies from about 5 or 6 of the large breeds to 7 of the Downs and to 9 or 10 Delaines.

to the total size of flock. These changes had been going on since 1900, but were accentuated after 1910, and by 1917 relatively few men retained their wethers beyond 3 or 4 years of age. Most of those who bred and ran wethers disposed of them as fat sheep at or soon after the removal of the second fleece, i. e., as fed yearlings, though practically 2 years of age. A greater number of the growers disposed of a large part of their flock increase as lambs in the fall, to be fed by farmers in other localities during the winter. There was also an increase in the number of men who endeavored to fatten their own lambs the first winter to sell fat after shearing. The rough topography was a handicap to this practice because of the difficulty of producing grain and the erosion which resulted, but the tendency was strongly toward an increase in mutton and lamb sales on practically all farms. A large number of shepherds in less rugged localities retained their flocks despite local decreases in sheep, but the finewools more nearly held their own in the rough, isolated areas, where natural conditions favored them most strongly and where competition with other lines of production was less keen.

RECENT NUMERICAL CHANGES.

Since 1916 enhanced prices of wool and mutton, more especially of wool, have resulted in a slight increase in sheep in this region. Sometimes there has been a corresponding decline in cattle. Many shepherds welcomed the chance to reduce the number of their cattle in favor of sheep in order to improve the condition of their farms. Changes since 1910 are shown below:

Number of sheep in Ohio, 1910–1920.

[000 omitted.]

	1910	[a] 1917	[a] 1920
Ohio	2,890	2,182	2,230
United States	39,644	35,998	36,753

[a] On hand Jan. 1. From estimates of the U. S. Department of Agriculture, revised on the basis of sheep of shearing age as reported in April, 1910. These figures are presented solely for their suggestive value as indicating recent changes in number of sheep, and do not include lambs purchased for feeding and sale by or before shearing in the spring.

Coincident with the increase in number there has been in many areas another general abandonment of crossbreeding. This was not usually the case where other lines of production had forced sheep permanently into the position of a secondary enterprise, or where men had adopted crossbreeding for the production of market lambs but maintained a finewool ewe flock either by breeding or purchase. In many broken areas adjacent to the distinctly finewool sections, however, shepherds who had used the Down crosses but retained

crossbreds for flock maintenance welcomed the opportunity to resume finewool breeding.[6]

Cows versus Sheep.

At the same time, in some counties many producers who had replaced sheep with dairy cows now went back to sheep. This was in part due to locally unfavorable prices for dairy products after the price of concentrates soared, and in part to increased requirements by urban health officers. In less favorable situations these requirements were often deemed entirely too stringent to warrant expensive alterations in dairy equipment at the prevailing prices. Another factor was the item of labor subsequent to the entrance of the United States into the war. Men with a larger dairy than they could conveniently handle sometimes replaced a part of the cows with sheep. In many instances where the labor factor was less pressing, it was easier to secure good sheep than to replace "boarder" cows with more efficient dairy stock. This, with the swift rise in price of feeds during the past four years, was a compelling reason for the reversion from dairy cows to sheep. In some instances the farmers were advancing in years, and rather than depend on hired labor, even if available, they curtailed the herd in favor of sheep. It seems doubtful whether much of this local replacement of cows by sheep will be permanent if the prewar ratio between prices for sheep and dairy products again prevails.

FLOCK MANAGEMENT.

At the present time the Delaine type of Merino is kept almost exclusively in the rougher areas of this region where sheep are a major enterprise and also in many localities where competition with other lines of production has made them of secondary importance. The finewool breeding areas have been somewhat more restricted since 1910, but in many localities where sheep decreased steadily until 1917 the flocks which were retained were composed very largely of fine wools. The wrinkly type of Merino has practically disappeared except in stud flocks.

Delaine ewes are rarely bred to lamb before 3 years of age, and are retained for four to six lamb crops, usually five. In the typical flock there are, at the beginning of the winter, the ewe lambs to be retained for flock maintenance and females a year older to be bred the

[6] Their flocks became healthier, more sheep could be kept on the same area, and the gain in quality and weight of fleece practically offset the lower weight of the lambs when sold in the fall. If able to feed the lambs until shearing time, animals with two or more Down crosses, aside from danger of parasite infection before removal from pasture, consumed far more grain than the same number of finewools and were apt to become too heavy for the market. If not fed enough to send them off fat, they had not the desired quality, and if disposed of too early, but with quality, the market was likely to be somewhat uncertain.

next autumn as "long 2 year olds" to lamb the following spring. These lambs and "long yearlings" usually constitute about 40 per cent of the number of breeding ewes present after January 1 provided the cull aged ewes of that season have already been disposed of. The proportion of other sheep present varies widely, depending on the system of management followed. The lambs are dropped from the middle or latter part of March until early in May, and in most localities the length of the lambing season depends largely on the number of breeding ewes kept.

In some localities in these areas up to 60 per cent of the lamb crop is now sold when weaned (August to September), or within a few months thereafter, and is usually shipped into sections where heavier grain production is the rule—chiefly into western Ohio for fattening in the winter. It has been estimated that 40 to 50 per cent of the finewool lamb crop is so disposed of in a normal year. The remainder, aside from ewe lambs retained for flock maintenance, are fed for one or more winters on the farms where bred. Occasional flocks of wethers above 3 or 4 years of age are more commonly found on farms operated by men somewhat advanced in years. By running flocks largely composed of wethers they avoid much of the exacting care required by ewe flocks at lambing time. Less shelter is required for wethers, and during the winter they can more safely forage for a larger part of their feed than breeding ewes. A few men maintain flocks composed solely of wethers because of the minimum of labor involved, and in extreme cases run the sheep until they are 8 or more years of age.

There are now seven fairly well-defined methods of management in the distinctly finewool producing areas. All of these tend to shade into one another to a considerable extent. One, the least important, is wool production with flocks composed almost or altogether of wethers. In the latter case the animals are bought as lambs and retained for a number of years, or the flock is replenished with older sheep each year. Sometimes a grower stocks up each fall to the limit of his grain supply and fattens most of the wethers for spring sale. Then there is the traditional method of wool production with flocks in which the wethers considerably outnumber the ewes, occasionally with some fattening of purchased wethers in addition to those raised. Under both these systems wool receipts predominate in the flock returns. The second was the prevalent type of management prior to the nineties.

In a modification of these systems wethers are rarely run to more than 2 or 2½ years of age. They are sold immediately after the second fleece is removed, or, if not fat enough, are disposed of from grass the following fall or soon after going on dry feed. Surplus

ewes raised from the same lamb crop are sold either as yearlings or 2-year-olds for breeding purposes. In such flocks breeding ewes outnumber the wethers. The annual increase and receipts from sales other than wool are larger than in the earlier systems, but wool remains the greater item in the flock receipts.

A fourth system has become quite popular in recent years. Under it the lambs are fed through the first winter, and if not fat enough for sale after the first clip is removed are carried through the summer and sold from grass in the fall or shortly after going on dry feed the second winter. This is much more generally done than in 1910. Wool still surpasses lamb and mutton in the flock receipts, owing to the heavy fleece shorn from the fed lambs. A fifth system is to sell at, or very close to, the top of the market in the spring when sufficient grain can be grown to fatten the lambs properly. The growers universally agree that this system is more profitable than any of the foregoing, and also agree that it gives larger returns than the sale each fall of all but the most desirable ewe lambs and the maintenance of a strictly ewe flock. It has become quite popular in many sections where shepherds, unable to produce grain enough to fatten their own lambs, sell the lambs to be fattened in more favored localities. The percentage of lambs raised and sold is large, but wool still remains a more important factor in flock receipts than lambs and cull ewes.

The sixth system is the production of crossbred lambs from Delaine flocks. Many of the first-cross lambs are fat enough for market from grass in the early fall, and the others are either fed at home or sold as feeder lambs into other sections. Since the price of stock ewes became quite high about two years ago, more of the growers breed their own ewes from a Delaine buck kept for the purpose. Their returns are not surpassed by any other shepherds in the distinctly finewool areas. Those able to feed out their own thin lambs believe that they have a larger net return than otherwise. Wool sales are usually somewhat less important in their flock receipts than sheep and lamb sales.

The seventh system is as old as the first two, but is largely confined to the area east of the Scioto Valley and south of Fairfield and Perry Counties. There are many fine flocks in this area, as for instance in western Washington County, but the sheep largely run on year-round pasture, and are fed little hay and almost no grain. In very mild winters the wool clip is of fair growth, but lacking in weight. In most years, however, the clip runs largely to French combing and clothing length, is light in weight, and it usually is quite burry, seedy, and chaffy. More wethers of mature years are found in this section than is the rule elsewhere, because their rugged grazing habits enable

them to do fairly well under such an arrangement. Sheep husbandry in this area is considerably behind that of the counties to the northward, and in hard winters most flocks are probably run at a loss

Some shepherds produce hothouse lambs from Delaine flocks, but they are in a very small minority. Most of these lambs are bred from crossbred ewes, usually with at least one cross of Dorset or Down blood. In normal years wool is purely a secondary or minor item in their flock receipts.

From the above it is evident that most growers have approximated fairly closely to the more profitable types of flock management. A lamb sold in the fall for winter feeding brings nearly as much per hundred pounds as a shorn fat lamb the following spring. But the sheep feeder has the heavy fleece, in addition to increase in body weight and some increase in price per hundred pounds, to offset feeding costs. Finewool shepherds in the Ohio region universally figure on more profit in fattening their lambs than in selling them as feeders after weaning. This is due to the fact that the lambs rarely weigh much over 55 pounds in the fall (at about 7 months of age), and are fed until about the 1st of April, i. e., go on a "long feed." They reach the market at a period when it is usually at its best, early and midwinter fluctuations having been avoided. Native finewool lambs thus take the place in local feed yards that the light southwestern feeder lambs occupy in the feeding operations of Colorado and the Central West. When equally well finished the native lambs sell at the same price as the fed western lambs. As a rule, however, the growers attempt to fatten more lambs than their grain supply will properly finish. The result usually is that a variable but very large percentage is not in good market condition in the spring. Such lambs are sold at a discount or are carried over for sale as feeders in the fall, or fed through another winter. If sold to local buyers in the fall, these yearlings may bring as much per hundred pounds as feeder lambs, but in that case their proper value is appreciated at the expense of the real value of the lambs. If fed through another winter and marketed in prime condition as fat yearlings, they bring about 15 per cent less per hundred pounds than prime fat lambs. However, should they again come through in half fat condition, and be held over for another feeding period, they must sell as fed wethers at a further reduction of approximately 15 per cent below prime yearling prices. That is, with prime fat lambs selling on the basis of 100 per hundred pounds, prime yearlings sell at about 85 and prime wethers at 70. For this reason the more progressive shepherds, able to grow enough grain to fatten their surplus lambs, no longer run yearling wethers save in exceptional cases.

Growers unable to produce sufficient grain to run a flock composed solely of ewes and lambs on feed but who do not sell most of their lambs from grass in the fall as a rule do not retain their wethers beyond the second fleece. These men figure that their wool clip enables them to turn 12 to 14 cent feeder lambs into 10 to 12 cent fed yearlings (really about 2 years of age when sold), because of the large gain in weight the second winter after bringing the lambs through the first winter with very little grain. After the fed-yearling stage there tends to be a gap in sheep feeding until mature wethers are reached. When finewools come off pasture in the autumn as "long" 4-year-olds they have attained full growth. Practically all the feed consumed while on a fattening ration goes into flesh, fleece, and fat; that is, they are more "kindly" feeders. Most shepherds who run wethers for more than the second fleece feed them almost entirely on roughage until they put them on fairly heavy feed at 4 or 5 years of age. Few men retain sheep beyond that age in east central Ohio. It should be borne in mind, however, that relatively few growers in this area produce enough grain to turn off all their lambs in choice to prime condition in the spring. Most growers who feed out their lambs calculate on about 10 tons of hay and 100 to 175 bushels of corn or its equivalent per 100 head. Such men remove a fleece of good growth, but the lambs are in only fair to good condition. Such feeding is fairly profitable with a demand for wool such as prevailed in 1919, but with a normal ratio between wool and lamb prices the receipts are much closer to expenses than was the case in 1917–1919.

It would seem that a close culling of the flocks each fall, in order to finish properly the animals fattened for spring sale, would prove more profitable to the finewool shepherds over a period of years. Entirely too many sheep and lambs are disposed of in half-fat condition each spring. This would appear to be especially good practice in view of the recent decline in wool prices. It also seems evident that shepherds who run wethers for more than the second fleece are operating on a less carefully thought-out system and make less efficient use of their feed than those who make no effort to fatten them until the animals are full grown. With what seems to be a substantial return toward the prewar wool prices, however, wether production for more than the second fleece would seem to be out of place in this region. In the long run, unless finewools remain permanently higher in price than half-blood and lower grades, disposal as feeders, in the fall, of such lambs as can not be properly fattened during the winter, probably will be a more profitable practice for shepherds unable to fatten all the lambs not needed for flock maintenance. The fact that in spite of high wool prices in very recent years practically one-half of the lamb crop has been so sold each

autumn, and up to 60 per cent of it in some areas, is highly significant.

Very few growers in this region make use of special forage crops (such as rape) in order to have the lambs in better than feeder condition in the late summer and early fall. This at first seems somewhat surprising. There is no doubt that many would find such crops a very profitable investment. In many cases, however, shepherds in the hill sections need all the land not too steep for such crops for their grain production in order to winter their sheep properly. Grain is the main desideratum of tillage in these areas, and the relatively small proportion of land suitable for grain growing can not well be spared for green forage crops.

COST DATA OF FLOCK MANAGEMENT.

In connection with a survey of the recent tendencies in the sheep husbandry of this region detailed cost data were secured for the calendar year 1918 from 21 shepherds in order to arrive at an approximation of the cost of growing wool in finewool flocks.[7] One of these records was for a flock which produced hothouse lambs, and two were for stud flocks. As these are not strictly comparable with commercial finewool flocks, they are not included in the following discussion.

All records but one were secured in Harrison County, Ohio, and Washington and Green Counties, Pa.—the heart of the Delaine area—where the wool clip is uniformly of high quality and commands top

[7] In securing these data feed was charged at the prevailing price at the beginning of winter, unless a part was purchased. Interest on capital invested in feed was prorated over the feeding period at 6 per cent, and storage charges on it were included in an interest, depreciation, maintenance, and tax charge of 10 per cent on buildings, or that part of them used for sheep. The charge for buildings varied from 15 cents to $1.12 per head of animals shorn. Interest on investment in sheep was charged at 6 per cent on the average inventory at beginning and end of the year, save where unusual purchases or sales were made which would have made such computations inexact. In such instances interest on capital involved in such sales or purchases was charged only for the period of time involved. Pasture was charged at 20 cents per month for sheep and 7 cents for lambs. It has been the custom in this region to reckon 10 Delaine sheep as equivalent to one cow, horse, or steer in pasture requirements. This ratio might at first seem high, but the sheep are usually kept on grass four to six weeks longer than cattle, which circumstance makes the ratio fair enough. In the summer of 1918 pasture for cattle was reckoned at $2 per head per month. All growers but one agreed that the value of the manure and the weed eradication by sheep offset the "chore labor" of feeding. Accordingly, no charge was made for such labor and no credit allowed for manure. All other labor was charged at the rate of $4 per day or 40 cents per hour. Such is labor of a skilled character which can not be left to a casual "hand," as inapt help may easily cause serious damage to the flock in a short time. This is especially true at lambing time, and when the flock is trimmed or "crutched" prior thereto. Labor charged at the above rate included crutching, lambing, sorting and changing the flock while on pasture, and medication when done. The use of a man and team was charged at $7 per day, the going rate. A decrease in inventory was charged as an expense and an increase credited as a receipt, save in a few cases where unusual sales or purchases represented an addition to or a realization of capital investment. The total flock expenses were prorated against wool in proportion to the percentage of receipts from sales of wool to the total flock receipts. The shearing expense was charged entirely to wool.

prices. The shepherds were exceedingly careful in their statements, welcomed close checking of all items, and were interested in giving accurate data in order to arrive at as close an approximation as possible of their production costs. It is believed that the expense per head of sheep shorn in these flocks was typical of other areas in the finewool region. It is possible, however, that the cost charge per pound against wool in the flocks studied was slightly lower than the average in the region because the quality of these flocks was uniformly high, and the clip practically as heavy as normal. Nearly all growers in the region either had unusually heavy feed costs because of the extremely cold winter of 1917–18, or had a wool clip lighter than usual and a smaller percentage of lambs raised. After such a winter as 1917–18 most men shear somewhat less wool than after one which is crisp but not unusually cold, unless they have, or buy, extra feed. Nearly all of the growers interviewed in the cost study took particular care to offset, at least in part, the excessive cold. They also practiced more closely such economies as throwing to steers the coarser hay left in the racks by sheep, hay which otherwise would have been pulled out by the sheep for bedding, and a similar use of corn fodder after the sheep had picked over it. Some of these men found that they could winter nearly twice as many steers on the roughage wasted by a given number of sheep as had previously been done. Such careful handling of the roughage, in the opinion of some of the shepherds, was equivalent to an increase of at least one-tenth of the amount actually fed to cattle and sheep, and to an increase of at least one-fifth, if no attention had formerly been paid to such economies. The profit per pound on wool shorn by these growers was much larger than that secured by others, because most of them sold through a special pool at prices considerably above those paid elsewhere in this region in 1918.

Only 2 of the flocks shown in Table XXVI were secondary enterprises on the farms. The other 16 were major enterprises. On most farms of the distinctly finewool areas, other live stock, nearly always cattle, are now approximately or quite as important as sheep. As a rule, these two are the only live-stock enterprises of major importance. Hogs are kept in small numbers, usually a few more than are necessary for the needs of the farm home. Details concerning these flocks are presented for their suggestive value only. The more significant figures are presented in tabular form below to show more conveniently the contrasts between expense and receipt items in the different systems of flock management followed on the farms studied. These differences in costs and receipts are presented solely to suggest the proportional variations in such items under the different systems of flock management.

TABLE XXVI.—*Expenses and receipts under different systems of management based on a study of 18 flocks, 1918.*

Character of flock.	Size of flock.[a]	Sheep investment per fleece shorn.	Expenses per fleece.					
			Dry feed.	Pasture.	Labor.	Shearing, etc.	Miscellaneous.	Total.
Wethers	73	$10.14	$2.96	$1.50	$0.45	$0.21	$1.02	$6.14
Wethers and ewes	362	9.26	3.33	1.43	.43	.20	1.47	6.86
Ewes and young wethers	274	10.59	3.66	1.52	.51	.20	1.16	7.05
Ewes and fed lambs	164	10.91	4.02	1.20	.67	.22	1.24	7.35
Ewes and cross-bred lambs	103	10.47	4.03	1.64	.73	.22	2.66	9.28
General average	244	10.08	3.59	1.44	.51	.20	1.37	7.11

Character of flock.	Receipts per fleece.			Net profit per fleece.	Per cent of receipts from wool.	Charge per pound against wool.	Price received per pound.	Difference between charge and price.	Average weight per fleece (pounds).
	Wool.	Sheep and lambs.	Total.						
Wethers	$6.75	.....	$6.75	$0.61	100.0	$0.670	$0.736	$0.066	9.12
Wethers and ewes	6.08	$2.47	8.55	1.69	71.1	.586	.724	.138	8.42
Ewes and young wethers	6.44	2.97	9.41	2.36	68.4	.557	.736	.179	8.76
Ewes and fed lambs	6.59	3.91	10.50	3.15	62.8	.509	.712	.203	9.25
Ewes and cross-bred lambs	5.92	6.91	12.83	3.55	46.1	.516	.690	.174	8.58
General average	6.29	3.05	9.33	2.22	67.4	.549	.724	.175	8.70

[a] Number of fleeces shorn.

For comparative purposes purely estimated figures are also presented in Table XXVII for (1) a Delaine flock from which all the surplus lambs were sold in the fall at about 6 months of age, (2) one in which they were fattened, and (3) a Down flock from which the lambs were sold in the fall. These figures, compiled by agents of the Commission, in conference with a number of careful, experienced shepherds, are based on their long experience as to feed and other costs as modified by the severe winter of 1917–18. They apply to 1918 conditions only. Such figures are sometimes more significant than those secured for a limited number of flocks by means of a cost survey. It should be noted that the Down flock estimates apply to such flocks kept on general farms in the better farming districts. They are not strictly applicable to Downs kept as a major enterprise in the more rugged areas, for reasons already presented.

TABLE XXVII.—*Estimated expenses and receipts for different types of flock, 1918.*

Character of flock.	Size of flock.[a]	Sheep investment per fleece shorn.	Expenses per fleece.					
			Dry feed.	Pasture.	Labor.	Shearing, etc.	Miscellaneous.	Total.
Ewes and feeder lambs	135	$12.06	$4.51	$1.59	$0.70	$0.21	$1.92	$8.93
Ewes and fed lambs	203	10.43	4.53	1.11	.57	.21	1.74	8.16
Down ewes and market lambs	116	12.48	5.62	2.08	.70	.21	2.26	10.87

[a] Number of fleeces shorn.

TABLE XXVII.—*Estimated expenses and receipts for different types of flock, 1918*—Continued.

Character of flock.	Receipts per fleece.			Net profit per fleece.	Per cent of receipts from wool.	Charge per pound against wool.	Price received per pound.	Difference between charge and price.	Average weight of fleece.
	Wool.	Sheep and lambs.	Total.						
Ewes and feeder lambs	$6.12	$4.34	$10.46	$1.53	58.5	$0.590	$0.68	$0.090	9.00
Ewes and fed lambs	6.46	4.39	10.85	2.69	60.0	.498	.68	.182	9.50
Down ewes and market lambs	5.10	8.32	13.42	2.55	38.0	.568	.68	.112	7.50

It is interesting to note in Table XXVI that as the system of flock management is changed from wether to lamb production, the average size of flock becomes smaller. This would in part seem to be due to the larger proportion of ewes present, and the larger amount of labor involved during the critical lambing period. There is relatively little variation in investment in sheep. The expense for dry feed, labor, and miscellaneous items increases, of course, with refinements in flock management. Receipts from wool do not vary widely, as none of the growers overlook the importance of the wool clip. Receipts from sales of sheep and lambs logically are augmented with the increasing preponderance of ewes in the flocks, and particularly when cross-bred lambs are produced. Total receipts are augmented in proportion. The progressive gain in net profit per head of sheep shorn would logically result from refinements in stock management when instituted by capable shepherds. The decline in percentage of total flock receipts derived from wool sales is paralleled by the corresponding decline in charge per pound against wool.[8]

Importance of Receipts from Wool.

In a normal year the percentage of total flock receipts derived from wool sold would be somewhat less than appears in this table, owing to the fact that wool prices advanced during the war to a greater degree than prices for mutton and lamb. The importance of wool in the flock receipts was therefore accentuated. The normal

[8] No sweeping conclusions can properly be drawn from such limited data, but Tables XXVI and XXVII, compared with the Indiana figures for 1919, have a suggestive value in another connection. All things considered, it seems probable that these Indiana data for 1919 are fairly comparable with the Ohio data for 1918. Many finewool shepherds are of the opinion that the Delaine, particularly if the large type now being bred by many flockmasters be used, would prove equally or more profitable than most Down flocks on general farms if the finewool lambs were fattened during the first winter and marketed after shearing in the spring. A comparison of the figures referred to would suggest that there may be a sound basis for this belief. In view of the habitual market depression during the fall months, when native lambs of the Down type flood the stockyards, and the small receipts and higher prices during late winter and early spring, this contention of finewool shepherds would seem to merit careful thought on the part of growers in the East and Middle West.

percentage from wool sales probably would range from somewhat above 60 for ewe and wether flocks to less than 60 for fed lamb flocks and to nearly 45 for flocks producing crossbred lambs. With so much of the total flock receipts normally coming from wool, however, the price secured for wool vitally affects flock profits. The fact that, compared with sheep, lamb, and wool prices of several years ago, wool in 1918 commanded a disproportionately high price, merely accentuated the profits secured. A study of the same flocks under normal price conditions would show costs closer to receipts.

In this connection it must be noted that the effect on sheep and lamb prices of the value of the wool carried by unshorn animals sold is nearly as great in this region as elsewhere, because close to two-thirds of the total number of animals sold each year are disposed of in the fall. Most of those sold in the spring are previously shorn. Shepherds selling all their surplus lambs and cull ewes in the fall, when the animals carry practically half a year's growth of wool, really derived nearly 70 per cent of their total flock receipts from wool, instead of approximately 60 per cent on the basis of 1918 prices. On the basis of prewar prices, the proportion would be nearly two-thirds instead of somewhat over one-half. Growers who sold fed sheep and lambs before they were shorn really secured about 75 per cent of their total flock receipts from wool, because of the premium placed on unshorn animals carrying a year's growth of wool—a premium in the case of lambs of 21 per cent of the live-weight price (per 100 pounds) of those shorn.

In 1910, in Ohio as a whole, receipts from sales of wool were sufficient to form 53 per cent of the total flock receipts, in spite of extensive feeding of western lambs in the corn-growing counties. Of these lambs a considerable proportion was marketed before being shorn, and this tended to obscure the real percentage of receipts derived from wool sales. At that time 26.3 per cent of the Ohio farms reported sheep, and the average size of flock was 41 animals of shearing age.[9] Of these, 76 per cent were ewes. The size of flock was much larger and percentage of ewes smaller in the typical fine-wool areas of the State and in similar areas adjoining Ohio. At the present time the size of flock in such areas is typified by the flocks on which detailed cost data have just been given.

CONCLUSION.

In a large part of the old finewool region of the upper Ohio Valley competition with other agricultural activities has forced sheep husbandry into a position of secondary importance. In those areas where sheep remain a major farm enterprise, natural conditions have

[9] U. S. Census, 1910, vol. 5, pp. 68 ff., 402 ff., 502–8, 528.

rendered them more nearly able to withstand pressure from other live-stock enterprises. A long period of low wool prices prior to 1916 reduced the size of the flocks, chiefly in favor of cattle, but except on farms with a less rugged topography than is the rule, and on many of the less rugged farms, sheep have usually remained an activity of major importance.

One of the chief competitors of sheep has been the dairy cow, particularly with the rapid growth of improved roads in recent years. A comparatively short distance from such highways, however, the condition and grades of the unimproved roads are such that in most cases dairy farming is impracticable. It will be many years before the rural transportation factor becomes one of minor importance, even with such farsighted State and local authorities as are found in this region. Both creameries and cheese factories have been started in many of these rougher areas, only to be abandoned after a few years.

The topography in the areas where sheep have more generally remained a major enterprise is such that a large proportion of the farm acreage must be kept in sod. Grain production is greatly restricted by the rugged terrain, and hay production often is insufficient for farm use. Agriculture must continue to be based on a grazing husbandry using live stock capable of fairly profitable wintering with a minimum of grain. Beef cattle and sheep raising are the live-stock enterprises which have been relied on in the past, and which must continue to be dominant in the future, except as gradual extension of improved highways enables producers to turn to dairying. There are two reasons why sheep are peculiarly adapted to these rougher, more isolated areas. They have made it possible fully to utilize steep pastures. Their relatively low grain requirement has enabled the shepherds to winter flocks of a sufficient size to permit full utilization of the grazing area. It seems probable that sheep have been a dominant factor in the maintenance of profitable agriculture in a considerable part of the finewool region.

Merinos of the Delaine type have survived in these flocks because they have proved better adapted to the environment than other breeds. Save in a few instances, only where it was possible to relegate sheep to a position of minor importance on the farm, have Delaines been displaced by mutton breeds. A change of breeds has not always taken place even then. It should be noted, however, that in commercial flocks the smooth-bodied mutton type of Merino—such as the Delaine—has entirely displaced the older, wrinkly type. The persistence of the Delaine type in flocks of major importance in the farm activities has often been laid to the inherent conservatism of the shepherds. To some extent this is true, but it is a well-founded conservatism, and but rarely is based on a blind prejudice. The

shepherds now living have in many instances seen the effects of two adoptions of crossbreeding, with resulting unhealthy flocks, uneven fleeces, forced curtailment of size of flock, and incomplete grazing of the pasture area.

More recent refinements in flock management have resulted in a fairly close approximation to one of the most profitable types of finewool sheep husbandry in this region—disposal of Delaine lambs in the fall for fattening elsewhere or sale after removal of the first fleece following several months on a fattening grain ration. If it persists, the demand for breeding ewes of the Delaine type for use in other regions where they have become deservedly popular because of their hardiness and grazing habits undoubtedly will continue to favor the continuance of such flocks in this region. With prices which have prevailed in recent years for stock ewes, it has often been profit able to hold the surplus ewes until after removal of the second fleece before disposal for breeding purposes elsewhere. In either of these systems the wool clip will continue to be more important than other flock receipts unless prices paid for lambs and breeding ewes rise to undreamed-of heights.

The production of crossbred lambs represents a further refinement in flock management, which in capable hands should prove more profitable than earlier systems. Past experience has not been altogether successful, and chances for loss are higher, but with flocks of 80 or more sheep, which normally require the keeping of two bucks, it has proved practicable to raise enough finewool ewes to maintain the flock and dispose of all the crossbred lambs, chiefly from grass in the fall. When, as is usual, the ewe flock is not thus maintained the continuance of such a system depends on a supply of breeding ewes being secured from growers who raise strictly finewool sheep. In this system wool receipts are somewhat less important than those from sheep and lamb sales. A further refinement would be to feed grain to the crossbred lambs in "creeps" while on pasture from the time they are large enough to eat it and then to market them when weaned or before. Such lambs would compete with those from the early lamb section south of the Ohio River.

It is extremely probable, however, that a large proportion of the shepherds in the rougher areas will continue with strictly Delaine flocks. The breeding is somewhat simpler, and not many care again to risk the adverse developments experienced with crossbreeding in the past. In the long run, it is likely that the typical finewool producer, who sells his increase as feeder lambs in the fall or as fed lambs in the spring, will secure as large a net return as one who uses a Down buck on part or all of his ewes. The wool clip will continue to furnish approximately 55 per cent or more of the total receipts in

such flocks, entirely aside from any effect the price of wool may have on prices paid for unshorn sheep and lambs sold.

In the areas of the old finewool region where sheep have survived as a major enterprise, they have done so in spite of severe competition with other agricultural production. Natural conditions have necessitated the retention of the flocks in most instances. With wool furnishing 55 per cent or more of the total flock receipts, the profits of sheep husbandry in this region depend, to a large extent, on the price of wool. They will be seriously affected by unrestricted competition with foreign wools.

Chapter 8.

OUR LAND POLICY IN THE RANGE STATES AND THE SHEEP INDUSTRY.

THE DEVELOPMENT OF THE WESTERN SHEEP INDUSTRY ON THE FREE RANGE.

Prior to the Civil War the greater part of the country lying west of the 100th meridian, except Texas and portions of New Mexico, Arizona, and California, was unsettled public domain. Shortly after that war large numbers of cattle that had been grazed in Texas were driven on to the range in the north and west. The cattle were soon followed by sheep. As there was an abundance of feed for all, and as the range business proved fairly lucrative, the original users, in order to take advantage of this free grazing, rapidly increased their herds and flocks. Others seeing the general prosperity speedily entered the business until much of the range was overstocked and the reserve supply of feed was exhausted.

In 1860 there were over 3,000,000 sheep in the far West, most of which were in Texas, New Mexico, and California. By 1870 the flocks had increased considerably and had begun to enter the northern ranges. It is estimated that at that date there were about 6,000,000 head in the far West. The sheep, which worked northward from Texas, New Mexico, and California were largely of the unimproved Mexican type.[1] Others were driven in from eastern States during the period of sheep reduction in those States in the sixties. From that time the number steadily increased, the census report of 1880 showing 18,000,000. Although in some sections the maximum was not reached until about 1903, the high point for the entire region seems to have been reached about 1885, when, according to some estimates, there were as many as 26,000,000 head. Since that date there has been a gradual decrease in the total number, attended by striking local readjustments in different parts of the range region.

The first sheep were grazed on the open range throughout the entire year. As there was no need for any investment in land or to provide winter feed, the early flockmasters were able to operate very cheaply. About the only investment needed was for the sheep

[1] Sheep had been kept in New Mexico for more than 150 years.

themselves, which in 1885 were worth about $2 a head. A camp outfit cost from $250 to $400 for a band of from 3,000 to 5,000 sheep. The main operating expenses were for labor, which at that time could be obtained cheaply, and for provisions. Estimates have been made which show that, exclusive of interest on the investment, some of the sheep were run at a cost which usually did not much exceed 50 to 75 cents a head. There were, however, occasional heavy losses during unusually severe winter storms.

Since only a small investment was needed, the business at first was remunerative, and anyone with experience could borrow freely, the original operators rapidly expanded their business until there were a number of companies with from 50,000 to 100,000 or more sheep. Numerous small operators also soon appeared.

As much of the public domain outside the Southwest was already occupied by cattlemen who had, to a considerable extent, apportioned the range among themselves through mutual agreement, the flockmasters were in many instances obliged to force their way in. This was possible because sheep are herded, and for that reason their grazing can be directed, which is impossible with cattle. The driving of sheep onto ranges already occupied by cattle caused many bitter feuds and some bloodshed, but the sheep rapidly gained in numbers. In many instances they ultimately crowded out the cattle.

THE EFFECT OF SETTLEMENT ON THE INDUSTRY.

The decline in the number of sheep, which began in some regions as early as 1885, was due in part to the settling of large areas of the better grazing lands for farming purposes and in part to the gradual decrease in the carrying capacity of the overstocked ranges. The homesteading of the lands west of the one-hundredth meridian reached vast proportions during the period from 1890 through 1910, and has continued until at the present time there remains relatively little unoccupied land on which crops can be grown.

Many of the earlier settlers were eastern tenant farmers and farm hands who took claims in order to establish farms for themselves, and were able to locate on the better areas. The early comers among these settlers were generally successful, particularly those who combined stock raising with grain growing. Many homesteaders were not able to judge the value of the land, and were deceived by "locaters" who were only interested in obtaining their location fees. Such settlers located on areas too arid for successful crop growing, and, after suffering great hardships, were frequently obliged to abandon these places. A considerable number of the homesteaders of recent years have had little, if any, experience in farming, especially under "dry-land" conditions. Many of them believed that

as soon as they could get title to land they could sell it to the neighboring stockmen at figures that would make their efforts worth while, these figures generally being far in excess of the actual value of the land. Some of these speculating homesteaders, not finding a ready sale when the title was obtained, mortgaged their homesteads and then abandoned them. In some instances unscrupulous persons have made entry to lands where there was water, or a temporary supply of water, or at strategic points for the purpose of getting trespass money from the stock raisers. To prevent such action and also to prevent the stockmen themselves from monopolizing the public domain by acquisition of the remaining watering places, the Department of the Interior during the past five years has been withdrawing from entry springs, water holes, and watering places, and holding them accessible to the general public. To date, over 226,000 acres have been withdrawn for this purpose.

The acquisition for farming purposes of vast areas of the best portion of the public domain has crowded back many of the stockmen who formerly used them to areas that are too arid for crop production or too broken for cultivation. The fact that these men have been forced back onto ranges already stocked to their maximum has resulted in severe congestion and overgrazing. Overgrazing, in turn, caused a gradual decline in the carrying capacity of these areas, until at present much of the remaining public range will carry hardly one-half as much stock as formerly, while many areas have become almost totally exhausted.

THE EFFECT OF THE NATIONAL FOREST POLICY.

Meanwhile the national forests, which have played a very important part in the general transition of the range industry, were established. The first forest was created in 1891, and since that date the area included in the forests has been extended until at present (June, 1920) the western forests embrace 131,739,137 acres of exclusively national forest land, and include about 75 per cent of the summer range. These forests were originally created in order to preserve the timber and to protect the watersheds, and for a short time were not open to stock, especially sheep. It was soon found, however, that if such grazing were properly regulated, stock could be grazed on these areas without in any way conflicting with the purpose for which the national forests were created. In fact, such grazing constituted a valuable fire protection, the importance of which soon was fully appreciated by the Forest Service. Under the systems of grazing that have been established more and more stock have been permitted to use these areas, until for the fiscal year 1920 the receipts from grazing in the national forests, which amounted to a little over

$2,600,000, formed more than one-half the total receipts from the forests.

At the time of their inclusion in the national forests many of the mountain or summer grazing areas had been seriously denuded of vegetation as a result of overgrazing. As soon as these areas were brought under control the number of stock was gradually decreased to their carrying capacity so as to prevent further devastation. Furthermore, under carefully worked out systems of regulated grazing many of these areas have been brought back to very nearly their original carrying capacity, so that they are now carrying more stock than when they were first included in the forests.

Limiting the number and kind of stock running on the national forests naturally worked occasional hardship on some users of these mountain grazing areas. It has, however, prevented ultimate exhaustion of the mountain ranges and has proved to be a very potent factor in protecting many stockmen, especially the small cattle owners living near by, from the results of invasion by tramp sheepmen.

At first there was a decided prejudice against permitting sheep to graze on these areas, as sheep were considered very destructive to the range. This prejudice, which to some extent still exists, is largely due to the former nomadic character of the business. During recent years, however, the number of sheep grazing within the National Forests has steadily increased until during the fiscal year 1918 when, because of war conditions more than the usual number of sheep were allowed on the forests, permits were granted for a total of 8,454,240 head of grown animals. This number was reduced to 7,935,000 head for the following year. During the fiscal year 1920 there was a further reduction to 7,212,889 head. This was nearly 400,000 less than in 1917 (7,586,034 sheep), but was made necessary by extension of cattle permits, possibly by local overgrazing during the two previous years, and perhaps was in part due to the severe drought of 1919.

At present a permittee in the national forests must either have been a user of the range prior to its inclusion within the forests, or he must own improved range property and be dependent on the range for running his stock, or else he must have purchased stock which are permitted within the forests in connection with improved range property. In granting grazing permits to such persons priority is now[2] given to United States citizens who are property holders, although when there is surplus range not needed by citizens of the United States aliens who have bona fide residences and property holdings within or adjacent to the National Forests may be allowed grazing privileges.

[2] This more strict reservation of forest grazing for the use of United States citizens began in 1921.

Permits are granted in the following order, subject to the stated preference:

"*Class A.*—Persons owning and residing upon improved ranch property who are dependent upon the national forest for range and who do not own more than the established protective limit number of stock.

"*Class B.*—Regular users of national forest range who do not own improved ranch property; and persons owning such ranch property who own numbers of stock in excess of the established protective limits.

"*Class C.*—Persons who are not regular users of national forest range and who do not own improved ranch property."[3]

The protective limits vary in different forests, but range from 25 to 300 head of cattle or horses and from 500 to 2,000 sheep or goats, as the demand for range justifies.

As will be inferred, the policy of the Forest Service is to give first choice to the numerous small operators and settlers living in or near the forests, and to limit the activities of the larger outfits, especially the large companies. Many of the stockmen, especially flock-masters, grant that the practice of protecting the small operator is commendable, but feel that it has been carried to an extreme to the detriment of the live-stock industry. They complain that they are frequently obliged to decrease the number of stock they are running in order to make room for settlers who, from the very smallness of their business, can not make a living and who, after trying it for a few years, are forced to drop out, only to be followed by others who must go through the same experience.

In making room for these settlers it has sometimes been necessary to scale down the prior users to a number of stock that is considered by some owners to be less than the most efficient economic unit. It is pointed out that the sheepman must have comparatively large units in order to operate economically, and that if he is compelled, in order to make room for others, to reduce greatly the number of sheep he is running, his operating costs per head may become prohibitive.

There is also considerable complaint on the part of the sheepmen that partiality is shown to the cattlemen. When the ranges have been taken away from sheep to make room for cattle, it has usually been for the purpose of making room for settlers. The settlers rarely are able to run sheep, but need some range for their horses, milk cows, and surplus stock. The sheep using the forests are usually confined to the rougher and higher areas where the feed is well adapted to their needs and where cattle can not be handled to advantage. Each band of sheep is given definite boundaries within which it must remain.

[3] The Use Book of 1918, U. S. Department of Agriculture, Forest Service, p. 103.

There is also a growing tendency on the part of certain "outdoor societies" to demand the establishment of numerous recreational areas and playgrounds, and especially preserves for wild game. This has resulted in taking away considerable areas of the range which the stockmen have used for many years. This movement will undoubtedly increase rather than diminish.

EFFORTS TOWARD STABILIZATION OF THE INDUSTRY.

As the range became more and more congested many of the original operators were forced out of business, while others were compelled to reduce greatly their herds and flocks. The cattlemen, because their stock were not herded and could not easily be directed to the good feeding places, and also because much of the range was too closely grazed for cattle, were the first to feel this pressure. The stockmen who have been able to continue in the business have largely been compelled to get control of a considerable portion of their range, either through purchase or by leasing.

Outside of Texas, which, when admitted to the Union, retained all its lands and later sold or leased them to farmers and stockmen, the first large areas to come under the control of the stockmen were a few of the Spanish land grants of New Mexico and California. These, for the most part, have fallen into the hands of large cattle companies. Some of these grants, which embrace several hundred thousand acres, were given by the Spanish and Mexican Governments as concessions for colonization or for other services rendered, prior to the acquisition of this territory by the United States.

As soon as competition for the use of the range became keen the stockmen living in regions where there were railroad land grants began leasing and purchasing such areas. These grants, which were extensive in area, were given to certain of the first transcontinental railways. They embraced all the alternate sections for a given distance on each side of the railroad right of way, with extensions to replace portions of these areas which had been previously alienated. Principal among these grants was a strip 50 miles in width on each side of the track which was given to the Northern Pacific Railway in Montana, Idaho, and Washington, a strip 20 miles wide on each side of the right of way of the Union Pacific and Central Pacific through western Nebraska, Wyoming, Utah, Nevada, and California, and in Oregon, and a strip 50 miles wide on each side of the Atlantic & Pacific Railway, which has since been absorbed by the Santa Fe, in the western part of New Mexico, and in Arizona.

The first leasing of these railroad lands was instituted by the Northern Pacific Railway in 1895 in the State of Washington. This railroad, which had been selling considerable areas of land for lumbering and agricultural purposes, found that it also had much land

considered fit for stock grazing, which was being rapidly denuded by overgrazing. At that time all stock was allowed to use the railroad lands, as well as the public domain, without restriction. The railroad tried the experiment of regulating the grazing on these lands under leases. At first the stockmen refused to lease the lands, and a court order was secured for the arrest of 30 leading flockmasters for trespass. The outcome was that these men began leasing the railway lands which they had previously used, and by 1898 leases to the number of 237 had been issued. In spite of the fact that full control was not guaranteed and cattle and horses ranged freely over the lands, the legal situation was so much improved and the results of this method of regulating sheep grazing were so beneficial that the sheep men were eventually glad to pay a grazing fee of 2 cents an acre. A later demand for much of this land for wheat-growing purposes led to keen competition for the purchase of it. In 1904 only 34 out of a total of 300 former leases were still in effect, and a large part of the land remaining under lease had been sold subject to lease-hold conditions.

The other railroads soon adopted the same general policy, and at the present time all railroad agricultural lands and practically all the better railroad grazing lands have been sold. The poorer areas have been leased to stockmen for a nominal fee, usually under arrangements which guarantee their ultimate purchase. In some instances the men who have purchased the railroad lands have paid more for them than their actual grazing value would justify. They have done this partly to prevent being forced out of business; also because the ownership of such lands gives a certain degree of control, both of the alternate Government sections lying within these areas and of some of the adjacent public domain.

Such "checkerboard" ownership, while tending to give control over the range, does not fully do so, because of the fact that Government land lying within such areas must be left free to all users. Because of these Government sections it is impossible for the stockmen owning the railroad lands to fence them and secure the protection desired. In consequence their holdings are subject to trespass, especially by cattle and horses, which are kept less under observation than sheep. To counteract this situation many of the stockmen have, so far as possible, consolidated their holdings. They have done this by leasing the school sections (Nos. 16 and 36 of each township)[4] and, wherever possible, by purchasing all of the patented lands lying within these areas that had been acquired under the homestead or preemption or various other acts of Congress, and by applying railroad scrip. This railroad scrip is title to land which

[4] Also sections 2 and 32 in Arizona and New Mexico. In Nevada these sections were traded for other lands.

was given the railroads by the Government in exchange for lands taken from them for the creation of national forests or Indian reservations. The stockmen have also influenced their States to select lieu lands (lands given in exchange for school sections falling within the national forests or Indian reservations) within their range, and have leased such lands. In these ways a considerable number of stockmen have been able to obtain control of all or the greater part of the range which they use and to fence and protect it.

In some of the better portions of the range country, as in the plateau region of eastern Montana, Wyoming, Colorado, and northeastern New Mexico, there has been extensive homesteading. In this plateau section practically all of the more level and better portions of the range have been homesteaded. The homesteaders who settled in the more favorable localities have been able to develop grain-growing types of farming. Many have succeeded by acquiring additional lands and by adopting a mixed live-stock and grain-growing type of farming. Such dry-land farms generally average more than 1,280 acres,[5] and 40 per cent or more of the receipts are from live stock. The more unfavorably located homesteads have generally passed into the hands of stock raisers, especially of the larger companies. A considerable number of the locations of recent years have been temporarily leased to stockmen.

In most of the States there are considerable areas of land in Indian reservations which the stockmen have been able to lease. In the Pacific Coast States they have also leased extensive areas of summer grazing lands from the lumber companies.

By all these various means large areas of the range have been brought under private control. In some sections, especially where the range is of such a character that the same area can be used throughout the entire year, this movement of the land into private ownership, especially into small holdings, has tended strongly toward elimination of the sheep. This is especially true in parts of the Pacific Coast States and in the prairie section lying immediately east of the Rocky Mountains. In these areas the range is especially well adapted to cattle, and is largely held in comparatively small units by cattlemen. In these regions, except in the case of large companies which are able to operate both cattle and sheep, the latter are rapidly disappearing. This is because cattle can be run in practically any size of unit and thus adapted to the range, whether owned, leased, or public. On the other hand, sheep must be herded if not run within prohibitively expensive wolf-proof fence. In Montana, for instance, the number of sheep has declined from 8,932,000 in

[5] U. S. Census, 1910.

1903, which was the high point, to 2,791,000 in 1920 (Jan. 1). This crowding out of sheep by settlers occurred much earlier in California, where the number of head declined from 7,646,800 in 1884 to 2,972,000 in 1920 (Jan. 1).[6]

In the intermountain region vast areas are unfit for agricultural purposes and, in consequence, the homestead movement has until recently been largely confined to the selection of tracts where irrigation is possible, or to tracts along streams where water is available for stock-raising purposes. Except for the railroad lands in southern Wyoming, northern Utah and Nevada, and northern Arizona and New Mexico, and certain school and Indian lands, it has been impossible for the stockmen to get control of any extensive areas. However, by purchasing all the patented lands along the waterways, by applying railroad scrip or leasing State lieu lands along the remaining watering places, or at strategic points where water can be developed, a considerable number of stockmen have been able to gain virtual control over the range they are using. In these regions, and in the semidesert areas, where the grazing is limited to the winter months when water or snow is available, sheep are numerous. This is especially true of the semidesert areas where the prevailing vegetation consists of shrubs and weedy annuals, which are not especially relished by cattle, although sheep thrive on them. Moreover, these areas are more suitable for sheep which, being herded, can be driven more easily from one range to another. They can readily utilize these areas in winter because of their ability to go a long time without water, or to quench thirst by eating snow. They then feed toward and in the mountains in summer. In some of the regions where the lowland areas are narrower and much of the land has been brought under irrigation sheep again come into strong competition with cattle. This is especially true of parts of the Pacific Northwest, where there is not sufficient open range between the winter feeding grounds and the mountains to provide for the needs of the stock.

In spite of the efforts of stockmen to stabilize their business by controlling the range there are many areas still uncontrolled which are badly overstocked and in consequence are steadily deteriorating. Unless these lands can be protected against constant overgrazing they will eventually reach a stage of virtual exhaustion. The stockmen using these areas fully realize this, but are not in position to give any protection.

In the United States the nomadic character of the sheep business has largely disappeared. The flockmasters for the most part have endeavored to establish themselves in definite sections and to acquire

[6] Estimated by the U. S. Department of Agriculture.

at least partial control of their ranges. There is considerable competition among these men and also with cattlemen for available feed.

On the other hand the overcrowding of the range, notably in some parts of Idaho, Nevada, Utah, and southern California, continues to be aggravated by tramp sheepmen, the presence of whom is generally obnoxious to other stockmen. It is said that these tramp sheepmen do much to keep the sheep-raising industry from taking its proper place as a stabilized industry. Numerous Americans operate in this manner, but as a rule tramp sheepmen are aliens. While some of them, both Americans and aliens, have improved ranch properties and homes, the greater number have no established range, but travel from place to place, crowding in wherever they can find feed. The aliens usually begin as herders, and when they have a little money saved up get some one else, usually another alien, to act as a financial partner, and together they buy a band of sheep. As they live with their sheep and as few of them have any real estate investments, they are able to operate more cheaply than Americans, especially those with heavy land investments. While the tramp sheepmen, especially aliens, are not generally allowed on the National Forests, they manage to find grazing by trespassing on the range of bona fide stockmen and the small settlers.

THE EFFECT OF THE PRESENT HOMESTEAD MOVEMENT ON THE INDUSTRY.

The most serious problem that confronts the flockmaster at the present time is the gradual homesteading of the lands lying between desert or winter ranges and summer grazing areas. A great many flockmasters are dependent on these lands for their spring and fall grazing. Even though they control their winter ranges and have allotments in the National Forest, many are absolutely dependent on the intermediate ranges on which to run their sheep for a period of one or two months in the spring after leaving the deserts or the winter feed lots and before the mountain feed is ready. They are also dependent on this range from the time they are forced out of the mountains by snow until the winter ranges have sufficient water or snow to make them available.

The gradual homesteading of this intermediate spring and fall range was greatly stimulated by the enlarged homestead act of 1909 (with later amendments), which allows the homesteading of 320 acres. This legislation has made it increasingly difficult from year to year for the flockmasters in many sections to operate. There are localities in which this movement has been gradual, where the stockmen, although temporarily embarrassed, have either been able or will be able to absorb these lands and to establish their business

on a permanent basis. On the other hand, there are localities, as in parts of Idaho, where many thousand acres have been filed on during a single year. In such localities the sheep men who are still operating are doing so with great difficulty.

The more recent enactment (1916) of the grazing homestead bill, which allows settlers to take 640-acre tracts, has made the problem far more pressing. A total of 74,638,926 acres has been designated up to the present time (July, 1920) under this act. Much of this lies in the intermediate or spring and fall ranges. In these areas and also in many other localities the sudden taking up of large bodies of land under this act is working a very great hardship on the sheepmen, many of whom will be compelled to discontinue operations during the period between the filing on and the patenting of these lands.

In those regions where this homestead movement is at all pronounced the live-stock industry will be greatly handicapped at least for some years. After these lands have been patented, however, the business will eventually be on a more stable basis, even though many of the present operators do not survive. Many of the new settlers under this act will succeed in establishing homes for themselves. But it is to be feared that a very large number of them will not only suffer severe hardship, but that they will fail in their attempt. There will be a considerable number who will not be familiar with the conditions, but will be attracted by the large acreage that is offered, and who, because of unfavorable locations, inability to adapt themselves to conditions, or lack of capital to develop their areas, will be unable to establish homes. The act will help the present settlers who are further able to exercise their rights under it. It will also benefit those who, after these homesteads have been patented, are in position to purchase sufficient adjacent lands for their needs. In localities where extensive areas are taken under this act, it is to be expected that large companies with considerable resources will eventually absorb much of the land.

There is comparatively little land which can be taken under this act that will keep enough live stock to provide a living for a family. Assuming that a homestead of 640 acres will carry from 15 to 20 cattle, which is much higher than the average carrying capacity of such areas, it would be necessary for a settler to have a minimum of four sections in order to have sufficient income to support a family and provide for the future. More often he would need as much as 10 or more sections.

In some localities this situation has resulted in a number of persons taking homesteads at strategic points, where they can compel the sheepmen to pay for the privilege of passing through to their summer range. This development has been especially acute in Idaho. In

that State the law prohibits sheep from grazing within 2 miles of a habitation, which makes it difficult in many instances to drive sheep from winter to summer ranges. Some Idaho flockmasters have been able partly to overcome this difficulty by forming local associations, which purchase and lease sufficient lands for their needs along the routes from winter to summer ranges. The sheep, by resting at night on the controlled areas and by moving slowly along during the day, are able to get through. The flockmasters are, however, often put to considerable expense in fighting trespass cases brought against them.

In most of the range States it has been necessary to establish stock driveways so that stock can be driven to shipping points and also to and from the winter and summer ranges. Practically 9,000,000 acres have been withdrawn for this purpose under the stock-raising homestead act. Similar driveways have also been established within the forests, so that stock while being driven to their owner's allotments will not trespass on the land of other permittees. Some of the stock trails are of necessity too narrow to furnish sufficient feed for all the stock that must travel over them.

The numerous settlers in some localities, the closeness of the flocks in others, and the greater sparseness of feed over much of the range area have been potent factors in reducing the size of flocks in recent years. This tendency has been intensified to some extent by the recent higher value of the sheep and the lower efficiency of the herders. Bands which formerly contained from 2,500 to 3,000, and occasionally more, sheep seldom exceed 2,500 and frequently have under 1,500. Not only has the size of herds been reduced, but, because of crowded conditions, it is sometimes necessary to keep two herders instead of one with a band.

Because of the limitation of range the majortiy of the sheepmen are now obliged to provide a sufficient quantity of winter feed to carry their bands through periods of bad weather and, in some sections, to feed them during the greater part of the winter.

The necessity of purchasing all or a part of the range has also greatly added to expenses. In some sections the flockmasters now have a heavier investment in land on which to run their sheep for a part of the year than they have in the sheep themselves.

THE NEED OF A STABILIZED RANGE POLICY.

For many years the need of a stabilized policy of range control has been apparent to all persons familiar with range conditions. As early as 1878, Maj. J. W. Powell submitted a report showing the necessity of stabilizing the use of the grazing areas. His investigations led him to believe that at that time, which was prior

to the severe overstocking, this could best be done by establishing grazing units, and that the equivalent of four sections, or 2,560 acres, was necessary in order to provide an economic unit. In accordance with these ideas he framed a bill to be introduced in Congress allowing the establishment of grazing communities of nine or more persons with an equivalent of four sections for each operator. However, no action along that line was taken. Further efforts at stabilization have been made from time to time, but also without result.

By 1900 the deterioration of many of the range areas was decidedly apparent, and it was fully realized that some action must be taken to establish a permanent range policy. Accordingly, in October, 1903, President Roosevelt appointed a commission to study the land situation and to make recommendations for the best utilization of the remaining public domain. This commission reported, in effect, that the general lack of control of the range lands had resulted in serious overgrazing and the ruin of millions of acres of valuable grazing territory, but that it was not too late to restore the value of many of the open ranges. Their report concurred with the opinion of the stockmen who were using the range, that some form of Government control was immediately necessary.

Since that time bills have been introduced in Congress looking toward ultimate stabilization of the range. At first there was a great diversity of opinion among the stockmen as to what policy should be adopted. These opinions varied all the way from the present "let-alone" policy to private ownership of lands. Not only has there been considerable disagreement among the stockmen as to the best method of stabilization, but it has also been very difficult to visualize their needs, not to mention securing remedial legislation. At the present time practically all of the stockmen realize the seriousness of the situation and are anxious for the enactment of some stabilizing policy which shall conserve the remaining range area. Not only will such a policy prevent the ultimate exhaustion of the range, but—and this concerns the stockmen more immediately—it will also make their operations less precarious. There are many stockmen using the public domain who have made a heavy investment in ranches or in watering places which they have developed in order that they might use these ranges. If they are deprived of the use of the ranges they will be forced out of business and in some instances will lose much of their investment in improvements.

It is probable that under any stabilized plan many of the stockmen, especially the larger operators, would have to reduce the size of their herds and flocks. Most of them would willingly submit to such a

reduction if they could be guaranteed sufficient range to allow running enough stock to provide a good living. They would then be able definitely to plan their business from year to year. They would also be in a position to protect their range, develop more watering places, provide winter feed, and in other ways put their business on a stable basis.

POSSIBLE METHODS OF STABILIZATION.

Of the various policies for the solution of the range problem, there are now five which are being given special consideration by stockmen. All of these plans, except the second, presuppose that the greater part of the lands included within the National Forests will be allowed to remain there and will continue to be handled as at present.

These five policies are: (*a*) The establishment of grazing homesteads in sufficiently large units to allow a good living to a family; (*b*) State range control; (*c*) the sale of the remaining range lands to the present stock-grazing users; (*d*) range leasing to such users; (*e*) and the establishment of grazing reserves to be operated under the permit system.

Because of the great diversity of range conditions no one policy will be universally applicable. That best adapted to one community may be highly detrimental to the interests of the stockmen in other communities. Furthermore, there are many regions in which the adoption of any one would prove inadequate. While these policies may seem conflicting, nevertheless they may all be made to supplement each other.

Establishment of Grazing Homesteads.

It has always been the policy of the Government to have the public domain open for settlement by persons desiring to create homes for themselves. Various means have been used to make these lands available. To this end a law was passed in 1862 making it possible to secure such land by homesteading it. Since that time there has been a general tendency to discard all other forms of granting title to public lands and to depend more and more on the homestead practice. Vast areas of western land have been taken under this act. Finally, about 15 years ago, there was little remaining land where a quarter of a section was sufficient to furnish a living. To meet this condition, Congress in 1909 passed an act allowing persons to homestead 320 acres under certain conditions.

This was followed by an act in 1916 which allows persons to homestead 640 acres where such lands are adapted only to grazing. Persons favoring this measure urged that under it the poor man could acquire a home without having to wait until he could earn money to

buy the land. In the past it has been possible for people of limited means to establish farms under the homestead act. But to develop and stock a grazing homestead requires considerable capital, and the average person not familiar with the business has usually found other investments more inviting.

After all of the lands which are considered suitable for homesteading under this act have been taken there will still remain extensive areas of public domain. Whether the best interests of the country will be served by again increasing the size of the homesteads or whether some other policy should be adopted is a problem for future consideration.

For reasons previously cited this law does not appeal to stockmen. Furthermore, they claim that such a law to work well should permit the present users of the range, most of whom have obtained all their allowed location rights and have invested their all on the stocking and use of the range, a more substantial chance to increase their holdings.

State Control.

In some localities there is a sentiment in favor of turning the remaining public grazing lands over to the respective States wherein such lands lie, each State to be allowed to use its discretion in disposing of or regulating the use of such unappropriated areas. The supporters of this plan contend that the State, by virtue of its local government, can more readily handle these lands in accordance with the needs of the different communities.

The advocates of this plan also urge that the State, by selling or leasing these lands, would obtain revenue which would tend to equalize taxation. The point is made that privately owned lands are required to bear heavier taxation, since lands held by the Federal Government are not taxable by the States. It is doubtful if the best interests of the general public would be served by such action. Moreover, the disposition to adhere to uniform Federal land policies is naturally strong, and it is doubtful whether most of the stockmen themselves would look with favor on any such attempt at a solution.

Sale of the Remaining Public Domain to Present Users.

Many persons affirm that the various present users of the range should be permitted, so far as possible, to purchase areas commensurate with their needs and thus bring the greater part of such lands under private ownership. Under such circumstances men could better protect the range against trespass. Water could be more systematically developed, grazing more economically distributed, and in other ways the range could be given a higher carrying

capacity. On this permanent basis stockgrowers would know how much stock could be run and could plan their business accordingly.

One objection raised against private ownership is that the land will eventually be absorbed by large companies. If proper restrictions governing the amount of land that any one person or company may purchase are made, and if sufficiently long-term payments are allowed, there is little probability of this. In fact, it is doubtful if the large companies would exercise as much control under such circumstances as they do now when operating on the open range. It is not uncommon for large outfits, especially sheep companies, to graze their flocks near the holdings of smaller operators, and by taking feed away gradually crowd out the latter. As a matter of fact, the homestead policy has enabled the large operators to get control of considerable bodies of land. When small operators are being crowded from the range by homesteaders the large operators, with plenty of money at their disposal, are peculiarly able to protect themselves by purchasing the necessary homestead tracts. Indeed, there is danger of dividing the range into holdings so small that their economic insufficiency must result in their eventual absorption by larger operators. On the other hand it is to be remembered that numerous large holdings were secured in days when cheap land was available and operating costs were low. In recent years, because of unwieldiness, many large ranches have been broken into smaller holdings.

Stockmen themselves frequently object to private ownership on the ground that the purchase of grazing lands will greatly increase their capitalization. Numerous sheepmen now have a much heavier investment in the land on which the sheep are run than in the sheep themselves. The private ownership of grazing lands will greatly increase investments and will undoubtedly lead to a decrease in the number of stock run by individuals. However, it is believed that on the better grazing areas there will be sufficient advantages largely to offset this factor. Experience has shown that when sheep are run on a controlled range usually a higher percentage of lambs is raised, and these lambs generally weigh more than when run on the open range. Not only are more and better lambs produced, but usually a heavier, cleaner, and better fleece is obtained. Where the range is under private control it has further been found possible, and often advantageous, to run both sheep and cattle on the same range. As these animals require a different character of feed, they can frequently graze on the same lands without interference, if their numbers are kept in the proper proportion.

It would, of course, prove impracticable to sell all lands, as there are numerous areas that have so low or uncertain a carrying capacity as to make their purchase uninviting. Such lands might be placed

in grazing districts and handled under a permit system similar to that used in the national forests.

Even though the general policy of selling the better portions of the remaining grazing lands be not adopted, some plan might be discovered which would allow those stock growers who already own considerable range adjacent to portions of the public domain, to consolidate these areas. The stockmen might be allowed to purchase tracts of Government land scattered through their range. Such scattered tracts are ordinarily of little value to anyone else, yet, because of them, the stock grower can not fence and regulate his range efficiently. In cases where large areas of railroad land are owned, if it is not deemed sound policy to sell the Government land lying within such holdings, some arrangement might be made permitting consolidation of the range through an equitable exchange of areas.

Leasing the Range to Present Users.

Another plan contemplates suitable division of the remaining available range not fit for agricultural purposes, and would allow the stockmen and settlers now using it to lease portions of it for a period of years. This solution is very generally favored by stockmen, and numerous bills designed to advance it have been introduced in Congress from session to session. The measure which has been most favorably by stockmen was known as the Kent bill. It was first introduced in December, 1913. It provided for the establishment of grazing districts on the remaining unreserved public domain and the issuance of 10-year permits for grazing on such areas. It also granted the right to fence and otherwise improve the range, and especially provided for the equitable disposal of necessary improvements when the permit should be canceled. The bill gave prior leasing rights to homesteaders and previous occupants of the range, and provided that the grazing fee should not be less than one-half cent, or more than 4 cents per acre, or an equivalent thereof per head of stock, subject to revision by the Secretary of Agriculture for 10-year periods.

The stockmen believed that such a system would tend immediately to put the western ranching business on a reasonably stabilized basis. It would also offer some inducement to present users to protect and develop their own range. At the same time it would not entail as heavy an investment in land as does private ownership.

There are numerous areas, especially in the Southwest, where because of the uncertainty and lack of rainfall sufficient feed is not always available. It would, of course, be impracticable to attempt to lease such areas and they might be handled under the next-mentioned plan. As this plan was not in accordance with the established

policies for the utilization of the public domain, and as it was considered to conflict with the grazing homestead acts, this bill was never reported out of the Senate Committee on Public Lands.

Extension of the Present Permit System.

The majority of range users, even those who prefer private ownership or the leasing systems, favor creating grazing commons and extending the permit system now used by the Forest Service. It is urged that this policy would result in immediate partial stabilization of the range industry; also that it would not interfere with further development toward private ownership.

At a convention of the live-stock interests held at Salt Lake in July, 1919, a resolution favoring the immediate creation of such grazing commons, to be administered by the Secretary of Agriculture, was adopted with practical unanimity. The plan contemplates the creation of grazing commons and the apportionment of the range under permits among the present users in proportion to their holdings. Such apportionment would be based on the present carrying capacity of the range. It would aim to prevent further destruction of the range and to give the present users a much greater assurance of the stability of the industry than they now have. It would, of course, result in greatly reducing the number of stock some men are now running. On the other hand, some men could run more.

The sheepmen mainly object to this plan because under present laws they might continually be obliged to make room for new settlers. This would necessitate gradually decreasing the size of individual flocks until they would ultimately become smaller than is now considered the more economic number. This plan has also been objected to on the grounds that it conflicts with the present grazing homestead act in that it does not adequately provide for new settlers.

It is to be hoped that it will soon be possible to work out a policy whereby the remaining public domain can not only be conserved, but that much of it can be developed to a much higher producing power. It is believed that a policy can be developed which will not only conserve the remaining areas, but will give the stockman a much greater degree of security, although many large companies may find it necessary considerably to curtail their operations. It is further believed that such a policy will also provide for such new settlers as are desirous of establishing homes for themselves so long as there are sufficient lands remaining. It may, however, become necessary at times to prevent further settlement in regions where a continued multiplication of holdings would make farming or stock raising precarious.

In the meantime, in order to facilitate some degree of stabilization in the range industry, the stockmen are taking the only means now at their disposal for getting more of the range area placed under some

form of administrative control. When local opinion on the matter is practically unanimous, sheep and cattle men unite to secure the incorporation in particular national forests, of adjacent areas valuable only for grazing and vital to their continuance in business, but usually with some prospective forest value. Within the past year nearly 2,000,000 acres have thus been added to the national forest area. The most notable of these additions was one of over 1,000,000 acres of forested and grazing land to the Thunder Mountain Forest in central Idaho. This land had been nearly ruined by overgrazing. Half a million acres of grazing and desert land were added to the Modoc Forest in California. There are now about 10 bills before Congress for similar additions to other forests mentioned in the bills and practically all of them have been favorably received. In self-defense, in the absence of general legislation bearing on the control of such lands in the public domain, the stockmen have united to secure the passage of these special bills. These and the grazing homesteads may prove perhaps to be the final solution of the problems of open-range control.

CHAPTER 9.

ORGANIZATION AND FINANCING OF THE SHEEP INDUSTRY IN THE RANGE STATES.

ORGANIZATION AND CAPITALIZATION.

In the early history of the range sheep industry the business organization was simple, and the necessary investment was largely in the sheep, which, prior to 1890, were worth about $2 a head. They were run in bands which, except with small operators just starting out, generally contained from 3,000 to 5,000 head. On the southwestern ranges, especially in New Mexico, where the sheep were largely in the hands of persons of Mexican birth or descent, the bands were generally much smaller, frequently containing less than a thousand animals.

Each band had a herder at all times to prevent loss through straying, to protect them from the ravages of wild animals, to direct their grazing, and to look after their general welfare. There was also a camp tender, whose duties were to keep the camp supplied with provisions and move it from time to time as the sheep were driven to fresh grazing grounds. In the small one-band outfits there was a camp tender, frequently the owner, with each band. With the larger concerns there was a camp tender to every two, and sometimes three, bands. The larger companies also employed foremen, who had charge of several bands and who were responsible for the general care of the sheep and for locating the camps in places with plenty of feed and water. Many companies also employed managers, who had general supervision over the entire outfit.

By moving the sheep from place to place they could be grazed on the open range the year round, as there was plenty of feed. Under such conditions ownership of land was generally unnecessary. It was also unnecessary to provide winter feed, except in unusually severe winters, at which time it was generally unprocurable. The only investment needed was for the sheep; the necessary camp equipment, which could be secured for from $250 to $500 per band; and sufficient working capital to meet current expenses for supplies and wages. At that time labor was plentiful and good help could be obtained on the northern ranges for about $30 to $40 a month and board. Board cost about $9 to $10 a month. In the Southwest, Mexican help could be secured at from $10 to $20 a month, and board

was proportionately low. This meant that the total capital to run a band of 3,000 head would, generally, not exceed $8,000. As the investment per unit of sheep was comparatively small and credit was easy, and as the business was generally profitable, numerous large companies, running as high as 50,000 to 100,000 head or even more, were formed in order to take advantage of the free range.

With the rapid taking up of the better areas of the public domain for farming purposes, both sheep and cattle were crowded onto the poorer areas which soon became badly overgrazed. As the settlement of the range continued this overcrowding became more and more severe until in recent years numerous stockmen have been forced out of business, while those who still remain have often been obliged to curtail greatly the number of stock they run. At the present time the number of sheep owned by any one person or company varies from 1,000 to 50,000 or more. Owners with only a single band, and especially with less than a thousand sheep, are still found in the northern ranges, but they are not numerous, except in the southwest. On the other hand, there are comparatively few companies with more than 30,000 head.

When the pressure for range became acute the cattlemen, who were the first to feel it, not only began to practice winter feeding but also to purchase a considerable part of their range. As the feed became still more sparse the sheepmen in turn, excepting those on the southern ranges, were compelled to take the same action. At first winter feeding on the part of most sheepmen consisted merely of keeping some concentrated feed, such as corn or cotton-seed meal, in the camp, where it could be fed in case of emergency. Some of them who ranged their flocks in the vicinity of irrigation districts made a point of keeping their bands near enough to be quickly driven to points where hay could be fed during periods of bad weather. In recent years on some of the more northern ranges, where there is little winter grazing available, the sheep are fed throughout the winter. In other localities, where the sheep are grazed primarily on deserts during the winter months, as in Wyoming, it has become necessary to build warehouses and store feed for emergency purposes.

There are still some sheepmen whose only investment is in the sheep and the necessary camp equipment, but in recent years the greater number, especially on the northern ranges, have found a considerable investment in land and improvements necessary. The amount of land that must be owned to remain in the business varies greatly according to local conditions. In some places they have been able to get control of enough range by acquiring small scattered tracts on which there are watering places. In many other instances it has been necessary to purchase a large portion of a range, and

there are many cases where the real estate investment exceeds $20 per breeding ewe. With the change in methods of operation, it has generally been necessary to have more improvements than formerly. such as lambing sheds, shearing sheds, dipping vats, wells, and water tanks. Such improvements vary in cost from only a few cents to as high as $2 or more per ewe.

In order to operate under the crowded range conditions, the sheepmen have been obliged to reduce the total number of sheep as well as the size of their bands. The number now varies from as low as 600 on some of the southern ranges to as high as 3,000 on some of the more open ranges of the north, though in the south the breeding sheep are generally run in bands of 800 to 1,000 ewes and their lambs, as against like flocks of from 1,000 to 1,200 in the north. It has also been necessary on some of the more crowded ranges to have with each band a camp tender, who spends the greater part of his time helping to herd the sheep. Operating costs have been considerably increased by these two conditions, quite apart from the cost of winter feed.

The change from an investment confined almost entirely to sheep to one where real estate considerably exceeds the live stock in value, as occurs in most of Washington, Oregon, and Montana, necessitates a capitalization several times greater than that of 30 years ago. During the war period capital investment per head rose greatly, increasing from $4.50 (Tariff Board figures) in 1910, to $10 or $12 in the period 1917–1919. During that time yearling ewes were sold from $16 to $18 or more a head. The increased expenses for labor, supplies, and miscellanies also made necessary a much larger working capital than formerly.

Assuming a one-band outfit of 1,000 ewes, valued at $11 per head, with 20 bucks at $40, an initial investment of $11,800 was called for in 1918–19. The necessary horses and camp equipment cost from $500 to $1,000, while a working capital of at least $2,000 was necessary. Under present conditions most operators also need a home ranch worth at least $5,000 to serve as a base of operation. Thus, under average range conditions, for a man entering the business, an initial investment of about $20,000 was needed during the recent period of high prices.

As a matter of fact, unless the owner is willing to live with the sheep and serve as one of the herders, one band is not an economical unit, since the labor and other operating costs will absorb all profits.[1]

[1] At the hearing held by the Tariff Commission (see Appendix) at Boise, Idaho, the point was made that the one-band operators in Oregon and Idaho are rapidly disappearing. There are, of course, a considerable number of one-band operators. These are mostly persons of foreign birth or descent who operate in parts of Idaho, Nevada, California, and in the Southwest. In nearly every case these men possess little, if any, property other than the sheep and the necessary camp paraphernalia, and live with the sheep, acting as herders while working toward larger numbers. Their standard of living is much lower than that of the average American.

Under ordinary range conditions at least two bands (1,800 to 2,500 breeding sheep) are needed if the owner is to receive a managerial wage. The smallest-sized outfit for efficient operation, however, appears to be about 5,000 head.

METHODS OF FINANCING THE INDUSTRY.

It will be readily perceived from the foregoing that the financing of the industry during recent years has been much more of an undertaking than in the days of free range and low sheep values, when any reliable and experienced man could borrow funds to get a start. The interest rate varied from 10 to 15 per cent, but the capital investment was relatively small and operating expenses were so low that profits usually were quite attractive. Of late years a large part of the increased cost of running sheep has resulted from rapid gains in operating expenses, particularly labor and feed. During the present period of readjustment general running expenses will be somewhat reduced, particularly for labor and feed. Capitalization also will be reduced through shrinkage of sheep values. Speculative valuations placed on land which has been leased, or which will have to be bought, will also be lowered. The problem of future range financing may be eased considerably through these means, although the existing state of unusual use of borrowed capital will probably for some time involve severe strain.

It has always been the practice of many sheepmen to use considerable borrowed capital. The necessity in recent years of purchasing land and making improvements forced a large number to become very heavy borrowers. Some met this situation by reducing their flocks and thus, in part, shifting their capital. War conditions also made it necessary for most of them to carry additional short-time loans with which to meet the increased cost of labor, supplies, winter feed, and, in the case of the early lamb growers, for replenishing their flocks. The greatest strain, however, occurred when, after meeting all these increases, they had also to meet a very heavy expense because of unusual climatic conditions. In the Southwest the three-year drought period, which was followed by the severe winter of 1918–19, with heavy flock losses and heavy feed bills, compelled these sheepmen to become heavy borrowers. On the more northern ranges the drought of 1919, followed by the unusually severe winter of 1919–20, made heavy loans necessary, and left most of the sheepmen greatly in debt.

Both the percentage of total capital borrowed and the percentage of heavy borrowers have risen greatly in the past five years. The percentage of borrowed capital now invested in the sheep business is estimated at from 25 to 90, according to the area and the extent to which ownership of patented land is necessary, and the re-

cency of purchase. Most estimates made by bankers range from 40 to 50 per cent of the total worth of the outfit. The percentage of sheepmen who are heavy borrowers is estimated at 60 to 90 for the different areas.

The chief difference in range financing three decades ago and during more recent years is found in the time of the loans and the larger amounts of credits for the same sized outfit. Wool being virtually the only source of income, loans at first were often made for a year, and matured when the wool money was available for payment of interest and curtailment of the loan. Loans for operating expenses usually were for shorter periods, but also matured prior to midsummer. Particularly since the establishment of the Federal reserve system, loans, for whatever purpose made, have been mainly for six months or less. This has been necessary to facilitate sale of the paper to correspondent banks and to buyers of commercial paper in general. Placing of loans was thus facilitated, especially with the more general entry of cattle loan companies and live-stock loan companies into the range live-stock field. Occasional long-term loans from real estate and farm loan companies, Federal farm loan banks, and individual investors, have been important locally in financing land purchases, particularly patented homesteads with a valuable water right, but they really constitute an exception to the general rule of six-months paper in range financing.

For some years there have been four forms of loan in use: (1) The genuine long-term paper just discussed, secured by mortgage, with or without partial or complete repayment privilege before maturity; (2) "riding loans" on six months' paper, renewed on payment of interest, reduced with each renewal, when possible, and secured usually by chattel mortgage on live stock, increase, and wool; sometimes by feed and crops grown, and occasionally by mortgage on real estate; (3) short-term loans for 30 to 90 days, sometimes 180 days, used mainly for general running expenses, secured by chattel mortgage, or in the case of operators of sound standing by personal note, and usually liquidated from proceeds of sheep and lamb sales; (4) short-term loans in the form of advances on wool or on lambs, made by wool dealers or live-stock commission firms at the central markets (sometimes by local sheep dealers), maturing at sale of the product, and secured by mortgage thereon and by guarantee of the sheepman. Sheepmen often have secured such advances even when local creditor banks were willing to make further loans, because the interest charged nearly always was less than the local rate, which in the last few years has ranged from 8 to 10 per cent.

The riding loans have been used to buy sheep and land, to make improvements, and sometimes in part to pay operating expenses, particularly in connection with purchases of live stock after unusual losses. Unless money was scarce, there usually has been no difficulty in securing renewals on payment of interest provided the borrower took good care of his sheep, but when riding loans were in part used for general operating expenses the creditors usually expected a curtailment before renewal. This was generally considered necessary in order to maintain a safe margin in case of recurrence of unusual expenses or losses. These loans have been made with increasing frequency during recent years by live-stock and cattle loan companies, which indorse and sell the paper to other financial houses. Banks at range points sometimes criticize the loan companies on the ground that local banks are left to carry the remainder of the sheep paper without adequate security, and that the companies have too readily accepted speculative values as a basis for loans during recent years of unusually high prices.

The short-term loans have been used primarily for running expenses. Sheepmen usually begin borrowing by or soon after Christmas to finance such winter costs as additional feed, labor, and supplies. Between February and April, according to location (as affecting time of shearing and lambing), additional credit is generally used to finance these operations and carry the outfit until the wool is sold. Not all the growers borrow in the early winter, as many produce practically all the feed needed, but practically all borrow just before lambing and shearing. Advances on the wool, when made by central market dealers or commission firms, have been utilized for this purpose almost exclusively. These loans, made to mature when the wool is sold, usually have been quite fully liquidated from wool receipts, and practically always so in the case of advances. The wool money has been counted on by the sheepmen to pay winter and spring expenses. Any balance generally has been left in the bank until needed for summer operating expenses. If not sufficient for such purposes further short-term loans may be secured, to mature when the lambs are disposed of. These, also, have usually been fully met at maturity from proceeds of lamb sales. When loans have not been liquidated from wool and lamb sales prior to 1920, it has usually been due to unusual feed or replacement costs resulting from unfavorable seasons, and the unpaid balance has usually been added to, or converted into riding loans for subsequent liquidation. The practice of making riding loans was rather generally followed in the Southwest from 1916 to 1918, when most sheepmen were unable to reduce their indebtedness for very long unless they sold out. It was also followed to some extent on the

northern ranges as a result of the late, unfavorable spring of 1917 and the hard winter of 1918, as well as the drought of 1919, and was widespread in 1920.

Possible Weak Point in Range Financing.

What has been criticized as a weak point in range financing is that so much of the borrowed capital is secured by six months' paper, whatever its use. In normal years this is not a weakness, as renewals on payment of interest, with or without curtailment of paper representing investment and not mere general expense, has been virtually a matter of routine in western banking. At the same time the making of loans on six months' paper has greatly facilitated the raising of needed funds through facility of discount of such paper when indorsed by the lending bank. This has been a potent aid in getting money for purchase of patented lands during the rapid extension of homesteading in recent years. The weakness lies in the fact that when money is tight, or the market outlook seems to endanger the loans, their liquidation can be demanded at maturity. In an industry such as sheep and wool production, with only two periods of income in the year (early summer and fall) and continuous outlay, but with the income periods subject to unusual and unlooked-for fluctuations largely beyond the sheepman's control, this precipitate maturity might have serious effects if creditors lacked constructive vision. Yet the present attitude of banks and lending companies in carrying, and in many instances adding to, past-due paper, in spite of financial stringency, a depressed market for lambs and a moribund market for wool, indicates that this source of weakness may be readily exaggerated. During the recent years of high prices, local credit may have been obtained perhaps too easily from loan companies on six months' paper. In the long run, however, unless cost and placement hindrances in the way of long-term real estate loans are lessened, it seems quite possible that six months loans may be of much greater advantage to the sheep men than loans through real estate mortgages.

There can be no question concerning the economy and the wisdom of financing peak load expenditures (lambing, shearing, and unusual feed costs) by short time loans. It would be costly for an outfit to carry through the year a surplus sufficient to pay such short-time [illegible] necessities, and for these [illegible] financiers are the banks, loan companies, and wool and live stock commission firms. [illegible] throughout the Southwest, prior to [illegible] for running expenses have been fully met when [illegible] narrow that con[illegible] necessary have merely [illegible] financial practice.

The safety of such outfits is seriously endangered by prevailing conditions. The break in the wool market in 1920 came just when a good and active market was most needed. A considerable number have sustained losses varying in effect from crippling deficits to imminence of bankruptcy. A severe winter and late spring preceded the slump in wool and in sheep and lamb prices. Unusual feed costs, light lambing percentage, heavy sheep and lamb losses, a wool market which became practically lifeless, and a poor market for sheep and lambs, have placed the banks at range points under a severe strain. They are now carrying new paper and past-due paper to help their customers through these trebled misfortunes. Not only have they been forced to renew, and often add to, old loans, but in many cases to carry paper with an irreducible minimum of security. Sometimes there has been virtually no security for a part of the paper other than the old frontier optimism.

BREEDS AND TYPES OF SHEEP USED.

The first flocks run on the open range consisted in the main of unimproved Mexican sheep, but soon were greatly improved by the use of Merino bucks and Merino ewe flocks brought in from the Eastern States. They were kept primarily for the production of wool. All lambs were retained and only aged wethers and ewes were sold. The settlement and overstocking of the ranges soon resulted in increasing the operating expenses to a point where the keeping of sheep for wool production only was not generally profitable. This coincided with the growing eastern demand for lamb, and caused the flockmasters to turn their attention more and more to the production of lambs. This continued until just prior to the outbreak of the World War. At that time most growers were giving as much attention to the production of lambs as to wool. The exceptions were southern New Mexico, southwest Texas, and a few other scattered localities where finewool sheep were still kept primarliy for the production of wool.

In changing from the strictly wool-growing basis, the smaller types of Merinos were replaced with the larger Rambouillet sheep. Numerous crossbred flocks were also developed. After a period of experimentation, the flockmasters have largely settled on a few leading types that are best fitted for their local conditions. In the southern range States much of the range is so broken, or so covered with brush, that the sheep must be closely herded to prevent losses through straying away from the band. There are also regions where climatic conditions are unfavorable for procuring good lamb crops. Because of these conditions, the Merinos, which have the close herding instinct, have been retained and are run primarily for the produc-

tion of wool. The Merinos are mostly of the Rambouillet type, although in places the Delaine occupies a prominent place.

In northern range States sheepmen operating in the rougher districts where herding is difficult have also found it necessary to continue their Merino (Rambouillet) flocks. Most of those on the more open ranges, where close herding is not necessary, are running crossbred flocks. These predominate in Wyoming, Montana, Idaho, and northern Utah. These crossbred flocks have been obtained chiefly by breeding Rambouillet ewes to longwool rams. The Cotswolds have proved the most popular for this purpose, although many Lincolns and some Leicesters and Romneys are used.

At first those running crossbred flocks purchased ewes for maintenance purposes from men who ran finewool sheep in less favorable areas. As the crossbreds increased in popularity, however, the number of finewool flocks became too limited to supply the demand for such ewes. This, together with the relatively low price for wool which prevailed prior to the World War, and the desire to grow heavy, earlier maturing lambs, increased the trend toward breeding the longwool type. This trend was so pronounced that for a number of years after 1910 there was almost no market for Merino rams. As a result of this tendency, just prior to the World War there were many flocks in which the ewes were losing the herding instinct, and whose fleeces were too coarse and too easily torn in the brush, and the quality of whose lambs had not been improved.

Partly because of the difficulty in handling these ewes on the range, and also because of the greater demand for fine wool, there has been a corresponding swing of the pendulum back toward the Merino basis. During the past four years there has been an unprecedented demand for Merino rams, while breeders of longwools have experienced great difficulty in disposing of their stock. By mating back with the Merino rams, the wool becomes finer and the ewes regain the desired herding instinct. Constant changing from one breed to another, however, usually results in a badly mixed flock and a very uneven wool clip.

The half-blood ewe (Merino-longwool cross) is a reasonably hardy animal that herds well under open-range conditions and produces more lambs, as well as lambs that are heavier and fatten younger, than the straight finewools. The fleeces, which grade about three-eighths to quarter-blood, are a little heavier, shrink slightly less than fine clips on the same range, and until the past year have met with a ready sale. This combination of qualities makes the first cross highly desirable when it is maintained. When there were plenty of Merino ewes to be had from which to breed first-cross animals, this was easily done. Later, when it was impossible to secure enough

Merino ewes, most flockmasters crossed their sheep from generation to generation until the flocks became very uneven. Some of the larger operators kept their sheep fairly uniform by breeding their finer-wooled ewes to longwool rams, and their coarser-wooled ewes to finewool bucks. Various efforts have been made to keep as near this half-breed type as possible. One such effort has been the introduction of the Corriedale, a breed that was developed in New Zealand mainly by crossing Lincoln rams on Merino ewes and by culling close to type for a number of years. While the Corriedales seem to have given satisfactory results, the number of breeding animals available for range use is too limited to make stabilization possible through this source alone. The Panama sheep (obtained by crossing Rambouillet rams on Lincoln ewes) has also been developed. In recent years the use of crossbred bucks has apparently been meeting with a fair degree of success. The United States Department of Agriculture has been endeavoring to develop a sheep that will fill this need. Its investigations indicate that it will be possible by proper breeding and selection to stabilize on the crossbred type, and that such stabilization can be brought about sooner than most persons had thought possible.

In some sections, notably in parts of Idaho and the Pacific Northwest, the flockmasters have made the production of lambs their prime business, wool being of secondary consideration. The Idaho flockmasters, in developing a quickly maturing lamb suitable for the midsummer market, are running flocks of Merino-longwooled ewes which are bred to Hampshire bucks. In parts of Washington and Oregon, and in other sections where range conditions are such that crossbred ewes can not be run, the Merino ewes are bred directly to Hampshire bucks. The Hampshire has almost entirely replaced other Downs for this purpose, as the lambs on the same range weigh more per head in the same length of time.

OPERATING EXPENSES.

In addition to heavy gains in capitalization, previously discussed, operating expenses have also increased greatly in recent years, particularly for the period from 1917 to the middle of 1920. The principal operating expenses are for labor, feed, interest, flock replacement, breeding expense, taxes, and shearing. In addition to these there are numerous miscellaneous charges, such as building of corrals and reservoirs on the open range, and transportation of supplies.

Labor.

Labor is usually the heaviest item of expense, though that for feed (including grazing) may sometimes be greater. In 1918–19 the herders throughout the middle and northern range States generally

received from $90 to $100 per month with board, the camp tenders were paid from $100 to $110 and board. Foremen were paid from $125 to $150, and occasionally as high as $200 per month, their wage varying according to the responsibility placed on them. In Arizona, where there are numerous Basque and American herders, but where Mexican help predominated, the wages for herders ranged from $50 to $75, while the foremen generally received about $100. In New Mexico and southwest Texas, where the help were practically all of Mexican birth or descent, the wages were slightly less, ranging from $35 to $50, while the foremen received from $60 to $75. The estimated costs of board for a herder and his dogs (usually there are one or two dogs in each camp) ranged from $25 to $50 per month, the lower figure prevailing in the Southwest and the higher in the northern range States. In addition the herders usually kill a sheep (more often a lamb) for food about every two weeks, which is included in the death loss.

During the latter half of 1920 there was a considerable reduction in wages which with the beginning of 1921 will probably become general. From the information available, wages for herders on the northern ranges will probably not greatly exceed $75 a month, while in southern New Mexico they will probably average about $35 a month. After this readjustment has taken place, it is probable that wages will be higher than in 1910, when cost data were collected by the Tariff Board. At that time wages varied from about $35 a month for herders and camp tenders in New Mexico to from $65 to $70 in Idaho. As already suggested, however, the labor expense per sheep will be greater than in 1910, because of the fact that it is now necessary to run smaller bands and to use more men per band than at that time.

In addition to the regular force, it is necessary to hire considerable extra help in the lambing season, for dipping, and at various other times. During lambing time it is usually necessary to have about 1 man to every 200 to 250 ewes for a period of about six weeks. These men received $75 a month and board on the northern ranges in 1919, whereas in New Mexico there was a man to every 100 to 150 ewes who received about the same pay as the herders.

Feed.

The feed cost varies greatly with the locality and according to the season. It divides naturally into (1) summer grazing rentals, and (2) the winter feed bill.

In the southern range States, where it is possible to run sheep the year round on the open range, aside from national forest fees the costs for grazing and for feed are usually negligible except in occasional periods of drought, when it may be necessary to purchase large amounts of feed to tide the sheep over. Such a condition

occurred during the drought period of 1917 and 1918, when in some instances the feed bills were greater than the value of the sheep.

In the Northwestern States, where sheep are often operated largely on deeded land, and where it is necessary to feed for long periods in the winter, the feed bill frequently is the heaviest item of expense. The annual rental on owned or leased land varies greatly. Aside from national forest fees, in the more open ranges where but little land is leased or owned, this may be only a few cents per head. In the more settled districts it may considerably exceed a dollar per head. The majority of the flockmasters graze most of their sheep in the national forests for periods ranging from two to three months to as high as six months, paying a fee of 2½ cents per head a month.

The winter feed bill is also extremely variable. In some sections, as on most of the southern ranges, there is frequently no expense whatever. In other sections, such as the Red Desert of Wyoming, it varies from a few cents to as high as five or more dollars a head, according to the season. In much of Idaho, Washington, and Montana, where it is necessary to feed for a period of four or five months, the feed bill for the winters of 1918–19 and 1919–20 amounted to from $5 to $7 a head.

Flock Replacement.

In order to maintain a breeding flock at standard strength, it is necessary to replace annually the ewes that die as well as those that are discarded because of age. While the number varies, it is generally necessary to replace about one-fifth of the breeding flock each year. In most cases, this replacement is made by saving a sufficient number of ewe lambs, although in some instances, as with many of the early lamb raisers, the replacement is made by purchase from other growers.

Each year, usually shortly after the lambs have been separated out, all aged ewes, especially those whose teeth have become badly worn, are culled out of the flock and shipped to market. Crossbred ewes must generally be discarded by their sixth year. Merino ewes will usually last one or two years longer. A ewe sold at this age, barring market fluctuations, will generally bring about one-half her value when she entered the herd.

This loss in value, or depreciation, of the discarded animals is not generally figured as a direct expense when the ewes are replaced by the saving of a certain percentage of the ewe lambs, but it is reflected in the inventory. This is also true of the ewes that are lost. The expense of carrying the ewe lambs held for replacement until they are bred as yearlings (at which time they become members of the breeding flock) is also usually averaged against the entire flock.

During this period they contribute one crop of wool toward their cost.

In those flocks where the discarded ewes are replaced by purchase, and where depreciation is not figured, the difference between the sale price of the discarded ewes and the purchase price of the new sheep is most easily handled as an expense. In the same way sheep purchased to replace those that die become a direct charge.

Loss of Sheep.

In spite of all precautions that can be taken, there is a heavy annual loss. Although varying from year to year, it averages from 7 to 8 per cent in the northern range States and is slightly heavier in the South. One of the heaviest losses is incurred by sheep straying away from the band. This varies with the character of the country, being heavier in rough or brushy countries; it also varies with the ability of the herder. A careful herder will lose comparatively few sheep, while with a careless one the losses may be heavy. Because of the general indifference of the herders, losses from this source have been unusually large during the past two or three years. There is also a considerable loss from predatory animals in spite of the fact that much money is annually paid out for the hire of trappers and hunters. Numerous other causes, such as disease and poisonous weeds, also take their toll of the sheep.

In addition to the above annual items, there are also occasional losses due to unfavorable weather conditions. When they occur they are generally very heavy and greatly increase the hazards of the business. In the northern range States losses occasionally result from blizzards and other heavy winter storms. Such a storm caught the Wyoming sheepmen in April, 1917. These men had been at a heavy expense in carrying their sheep through the winter, having been obliged to feed them for a long period. A sudden, heavy snowstorm, which because of the lateness of the season caught them unawares, so that few sheepmen were able to get feed to their sheep or to protect them from the storm, caused losses which in some instances amounted to 50 per cent or more of the sheep. In addition, such storms usually are followed by a short, light wool clip and a poor lamb crop. In Wyoming, heavy winter losses have been incurred in 4 out of the past 10 years.

Periods of drought also add to the hazards of the business. The sheepmen of the southern range States recently passed through a three-year drought. Nearly all of the men in that region were compelled to reduce their flocks greatly, and also incurred heavy expenses in shipping some of them elsewhere or in buying feed for those that were left. In some instances heavy losses were incurred from starvation. In the summer of 1919 a severe drought pre-

vailed on most of the northwestern ranges. Many of the flockmasters of Montana and Wyoming were compelled to move their flocks to other States for feed, some going to the eastward, to Wisconsin and Michigan, and many to Texas. As the feed on the fall and winter ranges made but little growth and the winter was unusually rigorous, others were forced to purchase unusually large quantities of feed to carry their flocks through the winter of 1919–20. Not only did this drought cause great inconvience, but a number of Idaho flocks were destroyed in resulting forest fires. In other cases, the feed was destroyed by fire, necessitating the moving of the sheep to ranges already stocked, or shipping them to other sections of the country.

Breeding Expense.

In estimating (see Ch. 10) the cost of producing wool, breeding expense has not been figured separately. If so figured it would amount to between 50 and 75 cents per ewe and in some cases to more. It varies according to the number of rams per thousand ewes, the value of the rams and the cost of running them. The majority of sheepmen purchase yearling rams, which have for the past three years averaged about $40 to $45 per head. Sometimes ram lambs are purchased, but in much of the country the service is too hard for them to stand up well. The average period of usefulness of a yearling ram is about five years, after which he has practically no sale value. As a matter of fact, only a comparatively small number of rams last that long, as there is ordinarily about 20 per cent annual loss. This means that about one-fourth of the rams have to be replaced yearly. Because of this heavy replacement sheepmen generally consider ram purchases as an expense and do not figure depreciation. Most of the sheepmen run 1 ram to every 40 or 80 sheep, the most common number being not far from 60.

The cost of keeping rams is considerably greater than for ewes. Rams running on the range are usually kept in bands of 350 to 500 head, the same equipment and help being required as for a ewe band. As but few men own that many, it is customary for several men to combine their rams into one band. The men operating in the neighborhood of irrigation districts frequently run them on irrigated pastures during the summer season. During recent years the men who are specializing on raising early lambs have made a practice of feeding grain to the rams during the breeding season, which lasts from a month to six weeks. An additional man is needed for about every 50 bucks to care for them during this time.

Shearing.

Shearing may be figured as a separate expense, or as is the practice with most sheepmen, it may be included under the general headings

of labor, supplies, and miscellaneous charges. From the standpoint of determining the cost of producing wool, it should be charged against the clip. Shearing usually begins in February in some sections of the southern range States and in the higher altitudes lasts through April and May. In the northern range States it begins in April or May and lasts into June. The practice of shearing before or after the lambing season varies somewhat according to climatic and range conditions. In the South it frequently comes before lambing. In the North it generally follows the lambing season.

Shearing camps are generally established at some central point where there is plenty of feed and water, and as near as possible to the railroad. The large operators usually have their own shearing plants. The smaller operators frequently combine and build a company shearing plant, getting some member of the company or a local man to operate it. This is a common method in Wyoming and many of the States to the north and west. In some localities centralized plants are operated by contractors, who shear most of the sheep in a community and prepare the wool ready for loading onto the cars at a fixed price per head. In parts of the Southwest, as in southwestern New Mexico, where feed is very sparse, centralized shearing plants are impossible, and it is necessary for each flockmaster to operate his own shearing camp.

The shearing costs for 1919 generally ran from 28 to 32 cents a head. An Idaho contractor, who handled a large number of flocks in one district, charged 34 cents a head to shear and pack the wool ready for loading onto the cars. His plant carried a crew of 20 shearers, who were paid 19 cents per sheep and board (figured at $0.02 per head). In addition, there were 18 helpers who were paid by the day. An extensive operator in Utah, who kept careful figures, found that, including wages and board to the shearers and the helpers and the other minor expenses, his costs were $0.29 per head. In New Mexico and western Arizona sheep are shorn by Mexicans, who in 1919 received 10 to 15 cents a head, and who shear an average of about 60 to 80 sheep per day.

Most of the shearing is done by professionals, who average from 160 to 170 sheep in a 10-hour day. Some of the more expert shear 200 or more. These men usually begin shearing in Arizona in January and gradually work north through Utah, Colorado, and Idaho, into Wyoming, Montana, Washington, and Canada, finishing the season in July. During the rest of the year they either work on ranches or live on their earnings. A few of the men go to the Southern Hemisphere for the shearing season and thus find continuous employment. As shearing is a specialized trade, and as the season during which it must be done is comparatively short, these men have

been in a position to dictate prices which the flockmasters have considered exorbitant. During the past two seasons there has been considerable trouble through strikes at critical periods, and in most instances the growers have been forced to yield to their terms. In some instances the growers were able to train new shearers from among the local settlers and small irrigation farmers.

Interest.

In Chapter 10 of this report the cost of producing wool has been figured in two ways—first, all interest charges excluded, the interest being considered as a profit. In the second place, interest has been figured as an expense. Where it has been figured as an expense the wool was produced at a loss in several States. (See Table XXX.)

The majority of sheepmen usually include the interest paid on borrowed money in their expenses, while that which is chargeable against the unmortgaged capital is ignored. The prevailing rate of interest on sheep loans in 1918 and 1919 was 8 per cent, which is a normal rate for live stock loans. That on land, which would more properly come under land rental, is usually about 1 per cent lower.

Taxes.

Taxes are of two kinds: First, that on the real estate and improvements, and, second, that on the sheep themselves. Where the sheep are operated in two States—as, for instance, Wyoming sheep that are summered in the national forests of Colorado—it is frequently necessary to pay taxes in each State. This is sometimes true where sheep cross county lines.

Other Charges.

There are also numerous other charges which, although small in themselves, nevertheless aggregate a considerable sum. Principal among these items are the supply account (which often includes provisions), the building and maintaining of corrals and reservoirs when built on the open range, the freighting of supplies to the sheep camps, and the necessary traveling expenses to keep the business going.

FLOCK MANAGEMENT.

The general systems of management are fundamentally the same throughout the range States. However, there are numerous variations and adaptations which have been developed in order to fit the various regional and local conditions. That the systems used in the various regions may be the more easily discussed, the range country has been divided arbitrarily into the following districts: The Central Range Area, the Idaho District, the Pacific Northwest, the Eastern High Plains Area, the California District, the Arizona District, the New Mexico District, and Southwest Texas.

The Central Range Area.

The Central Range Area includes western Wyoming, Utah, southern Idaho, southeastern Oregon, and Nevada. Extensive areas of desert lands, which are mostly surrounded by high mountains and which because of the lack of water are available for grazing only during the winter months, characterize this region. The sheep are run on these deserts for a period of four to six months during the winter, and then are moved to the high mountain ranges for two or three months of summer grazing, the intervening time being spent en route between the two areas.

The sheep in most of this region are of the Merino-longwool cross, the production of lambs generally being considered fully as important as the production of wool. They are usually run in bands of 1,500 to 2,400 head, and there is with each band a herder and frequently a camp mover who spend most of their time herding. As in other sections, in the larger companies the yearling ewes, the ewes that failed to breed, and wethers if any, are run separately in what is known as the "dry band." This usually contains from 2,000 to 2,500 head. If there is a sufficient number each of these classes may be run separately. In the small one-band outfits, such as are common in the Southwest, all classes may be run together.

In the more level portions, especially on the winter ranges, a specially fitted camp wagon is used. This wagon is provided with a stove for cooking and for heating purposes in winter, and is usually located at a point where there is a good supply of water. The sheep are grazed in that vicinity until all the feed has been utilized, being brought back each night to the wagon and "bedded down." When the feed within reach is exhausted, the wagon is moved to the next feeding ground, and thus continues throughout the season. The camp mover has an additional wagon for hauling supplies, and is also provided with a saddle horse and four horses which are needed in moving the camp. A complete camp outfit costs about $1,000. When the sheep are in the mountains, the wagons are left behind and a tent is used, the provisions and supplies being brought in on pack horses. In recent years instead of having the camp tender go long distances for supplies, they are brought out as far as possible in auto trucks, thus giving him more time with the sheep.

While some flockmasters still graze their sheep on the public domain the year round, the greater number own or lease a part of their range. Sometimes this part may be merely a few scattered tracts on which water is available and which are strategically located for the control of the surrounding range. More often it is a considerable area of winter, or of spring and fall range, where warehouses for storing feed, shearing camps, dipping vats and sometimes lambing camps are established. Wherever sufficient water is avail-

able for irrigation, a part of the land is devoted to growing winter feed.

Beginning with the winter season the sheep that graze on the deserts are driven to those areas as soon as there is sufficient water available for their needs, usually about the first to the middle of December. They are allowed to graze there, on such feed as shrubs and weedy annuals, until March or April, when, because of lack of water, it is necessary to move them to the spring range. In a few places where there are local irrigation tracts, the sheep are kept in the near vicinity, so that during periods of bad weather, they can be driven where feed is obtainable. On most of the winter ranges it is impossible to do this. In such case, the men who control a part of their range usually store feed for use in stormy weather. Some alfalfa hay is used, but it is rather bulky to transport any great distance, and there is considerable waste in feeding it. Concentrated feeds, such as cottonseed meal and corn, are more commonly used. Although most of the sheepmen try to provide sufficient feed to carry their herds safely through the winter, occasionally severe storms come up so suddenly that it is impossible to get feed to the sheep or sheep to the feed, even though only a few miles from the warehouses. Under such conditions severe losses are frequently incurred.

Lambing.—The lambing season comes as early in the spring as weather conditions will permit, usually in April and the early part of May, when the feed on the spring range is ready. Lambing is generally conducted on the open range, usually at some point on the spring range where there is plenty of water and feed and, if possible, where there is some shelter. In some cases shelter in the form of large tents or lambing sheds is provided. As the lambs are born the ewe band is gradually broken up into small bunches such as the "night drop" and the "day drop." After a day these small bunches are combined. Two or three days later these in turn are combined with another day's drop, the process of combining into larger groups being continued until the ewes with their lambs are finally consolidated into bands. When the lambs are about two weeks old they are docked and the males are castrated.

The percentage of lambs dropped varies considerably in different sections and in different years according to climatic and other influences. Based on the total number of ewes of breeding age, the average percentage of lambs docked (the tails are usually counted at this time) is about 70 or 80. Of these there will ordinarily be a loss of about 10 per cent by the time the lambs are separated out in the fall.

Summer ranges.—After shearing and lambing the sheep are gradually worked toward the summer ranges, mostly in national forests,

spending about two months en route while waiting for the feed to be ready in the high mountain sections. Some of the sheep are driven for a distance of 150 miles or more in going from the winter to the summer ranges, while others do not travel more than 50 miles. As there is not sufficient room for all the sheep in the national forests, and as the feed in these areas is better than on outside ranges, the sheepmen having permits to graze their sheep in the forests try to get all the ewes with lambs on these areas in order that the lambs may make a good growth. The "dry bands" are usually run wherever sufficient feed can be found.

The sheep are usually in the mountains from the middle of June or first of July until about the first of October, or when the snow begins to fall. They are then gradually worked down to the lower levels and onto the fall range, the same area as grazed in the spring. The lambs are then separated out, and those not retained for breeding purposes are shipped to the markets or to Eastern feed yards. The ewes that are no longer fit for range use are also sorted out and sold. The remaining ewes are consolidated into bands of 2,000 or 2,500 head, bred, and gradually worked back toward the winter range.

The Idaho District.

As the greater part of Idaho is mountainous, there is a large amount of summer range. In the valleys between the mountain ranges much land has been brought under irrigation in recent years. This is especially true in some of the wider valleys of the Snake River and its tributaries, where there are a number of irrigation districts, each embracing many thousands of acres. There is very little desert or winter range except in the southwestern and extreme southern part of the State, where the sheep are handled in the manner previously described.

Because of the abundance of alfalfa hay available for feeding purposes, the lack of winter range, and the more rigorous winters, the majority of Idaho sheepmen have come to depend more and more on winter feeding. Many flockmasters have their own irrigated farms, on which the necessary feed for the sheep is raised, while others buy large quantities of hay. This is usually fed on the place where purchased. Ewes that are fed come through the winter in excellent condition, and produce strong healthy lambs that are capable of making a rapid growth when turned on the range. As there is a heavy snowfall, the spring and summer feed is more luxuriant than on most of the ranges to the south. With the more luxuriant feed, these early lambs are able to continue their growth so as to be ready for the summer market. For this reason, and also because of the shortage of fall feed, which makes it necessary to reduce the size of the flocks early, a large number of the

Idaho sheepmen have directed their attention to the production of lambs that will be ready for the midsummer market (June-August). As this is a period when there is comparatively little competition, they have been able to command top prices.

The first shipment of early lambs is said to have been made by the three Gooding brothers in 1896, when they sent a combined shipment of 22 cars to Chicago. From this start, the business has rapidly expanded until in 1918 over 2,000 cars of early lambs were shipped from the Wood River district alone, while the total for the State was much larger. As nearly as can be estimated, 46 per cent of the sheepmen of Idaho are now engaged in this business. From the standpoint of producing a high quality lamb ready for the midsummer market, the western sheep industry has reached its highest development in this State. There are, however, other localities, as in western Wyoming and northern Utah adjacent to Idaho, and in parts of Oregon and Washington, where this business has also been highly, though not so extensively, developed.

The Idaho flockmasters have found that they get the best lambs by using ewes of the Rambouillet-longwool cross, which are well adapted to their range conditions. They are bred to rams of Down breeds, the Hampshire being preferred because of its greater size and more rapid growth. As the offspring from this last cross carries a fleece which is too open and tears easily in the brush, it has been found best to sell all the lambs. In order to maintain their flocks most sheepmen purchase their breeding ewes. A majority of them come from southeastern Oregon, southern Idaho, and Nevada. Some of the larger companies keep one ewe band with which to grow their own crossbred ewe lambs. The wether lambs from this cross are usually sold to Eastern feeders, although some are fattened in local feed yards.

As the early lambs are born in February and March, it is necessary to provide lambing sheds where they can be properly cared for. These sheds are provided with small pens where the ewes can be kept during the period of parturition and until the lambs are strong enough to go with the main band. The more modern sheds are usually fitted with labor-saving devices for the handling of feed and water and of the sheep themselves. A lambing equipment suitable for handling 1,000 ewes, including lambing sheds and corrals (based on estimates given by sheepmen), costs from $10,000 to $15,000 (prewar prices), or represents an investment of about $1.50 per ewe.

After leaving the national forests the ewes are usually grazed wherever sufficient feed can be found. Some are run on the fall range and on what little desert range there is until winter feeding time. Others are grazed on stubble fields, the aftermath of hay land, and

crop refuse (beet tops) left on sugar-beet fields. The winter feeding period usually begins about the middle of December and lasts until March 15 or April 15. It is customary to provide 200 to 250 tons of hay to 1,000 ewes. This hay formerly cost from $5 to $8 per ton in the stack, but during recent years has been selling for from $15 to $20, and even more. In addition, the ewes are usually fed a small amount of corn or cottonseed meal for a period of 6 or 8 weeks at lambing time. This means that in recent years the winter feed bill has run from $4 to $6 or more per ewe. It rarely fell much below $3 from 1913 to 1915.

During the first half of April the ewes are started toward the spring ranges; the sheepmen having pastures in the mountains work their way up to these during the month of June, getting on to the national forests about July 1. Some of the earliest lambs are ready in June, but most of them are sold during July and August, at which time they average about 68 pounds in weight. These go directly to the markets, mostly to Chicago, where the packers select the fat lambs. The few that are not fit for slaughter are sold as feeders to corn-belt farmers.

Because of the long winter feeding period and also because of the additional equipment for early lambing, the annual expense of carrying a ewe was considerably greater than for the previous district, and ranged from $8 to $10.50 per ewe in 1920.[2] This greater cost of production is offset, however, by the large lamb crop that is secured, which frequently exceeds 85 per cent, and sometimes is almost 100 per cent, and by the better price received for the early lambs.

The larger lamb crop is partly due to the fact that with lambing sheds, where the ewes and lambs can be well cared for, a greater number of lambs are saved. It is also partly due to the fact that the ewes are bred earlier in the fall when the weather is warmer and when there is less stormy weather. The ewes are more inclined to breed at that time, particularly when flushed on alfalfa fields in the irrigated districts.

While the producing of early lambs generally proves remunerative, there are, nevertheless, adverse years, as in 1919 and 1920. In 1919 the mountain feed, because of drought conditions, was much shorter than usual, and the lambs did not attain their customary growth. Fully 50 per cent of the lambs were too thin for slaughter and had to be sold as feeders, while those that were taken by the packers were considerably under their normal weight. Moreover, the shortage of range made it necessary to ship them at a time when the market was severely congested, so that they brought much less

[2] In 1920 this cost in a number of cases was as great as $13 a head.

than normally. In 1920 the sheepmen were put to great expense in carrying their flocks through the winter, while the receipts from lambs were less than for the past few years and there was no market for their wool.

The Pacific Northwest.

In Washington and in northern Oregon there is but little remaining open range. Nearly all of the original range, not too broken or too arid, has been homesteaded or purchased for wheat growing. This has made it necessary for the stockmen who wished to remain in the business to buy or lease their grazing lands, with the result that a large number of them now have a greater investment in land than in sheep. Many flockmasters in northeastern Oregon, who purchased range to prevent being crowded out by grain farmers, have found it necessary to devote their best lands to wheat growing. By running a combination business they are able to keep down operating expenses. Their sheep are grazed on stubble fields, which are frequently used for winter range, on the summer fallow (a crop of wheat being grown on the same piece of land every other year, the land being idle or "fallow" the alternate years), and the rougher parts of the range that can not be farmed. Some of the sheepmen are able to drive their sheep to the semidesert areas in the southern part of that State for the winter.

There is still a small area of desert land in central Washington on which a few bands can be run during the winter. While much of the deeded land is suitable for winter grazing most of it is more needed for spring and fall range. As there is insufficient winter range and as there is an abundance of alfalfa in the irrigated valleys, most sheep are winter fed.

A few Washington flockmasters own, or are able to lease from lumber companies, sufficient summer range for their needs; the majority, however, are dependent on the national forests for their summer grazing. Many of the sheepmen, especially those wintering in the Yakima Valley, find it impossible to drive their sheep to the summer ranges in the Cascade Mountains, and in the mountains of Idaho, and ship them by rail to their summer allotments. The sheep sent to the Idaho ranges are usually shipped on through rates to Chicago, a permit being granted to unload and graze them during the summer months. In the fall, the lambs that are not retained and the discarded ewes are shipped east on this through rate. The remaining sheep are shipped back to the fall range, or to the ranch, on a local rate.[3]

Because of the heavy winter feed bill, and also because of the heavy investment in land, the operating expenses in this region are

[3] Some use is made of Montana national forests in this way.

very high. This is especially true where it is necessary to ship by rail to and from the ranches and the summer ranges. Although the expenses are higher than in other regions (except Idaho), the flockmasters of this region seem to fare as well as those elsewhere, this being apparently due to the fact that the sheep are well cared for. Washington has the highest average weight of fleece (8.6 pounds in 1918 and 1919) of all the range States, while the lamb crop runs very high. Individual lamb crops average as high as 100 per cent.

As in Idaho the winter feeding of the ewes and the more luxuriant vegetation on the spring and summer ranges make the production of early lambs possible in much of this region. This is especially true of the Yakima Valley, Washington, where, according to estimates, 40,000 early lambs were produced in 1920. Practically all of these early lambs are sent to the Chicago market. A considerable percentage of the total Washington and Oregon lamb crop is shipped to the Pacific Coast.

A large part of the range on which the sheep are run is too rough and broken for the handling of crossbred sheep; consequently, the majority of the flocks are of the finewool (Rambouillet) type. In raising early lambs these Merino ewes are bred to Hampshire rams, and excellent market lambs are secured. Aside from the fact that the sheep are largely run on deeded land, the general systems of management are similar to those previously described.

The Eastern High Plains Area.

The Eastern High Plains Area includes that part of Montana, Wyoming, and Colorado lying east of the Rocky Mountains. In this area there has been a rapid decline in the number of sheep kept during the last decade and especially during the past three or four years, the sheepmen having been largely crowded out by persons taking homesteads. The sheep have almost entirely disappeared from the prairie sections of Colorado. The recent influx of settlers to take land under the 320 and 640 acre homestead acts has caused the number of sheep in Montana to decline from 4,379,000 on January 1, 1915, to 2,984,000 on January 1, 1919,[4] and 2,791,000 in 1920.

The majority of sheepmen in Montana are now operating on owned or leased lands. Those who live in the regions that were homesteaded earlier, where the homesteaders have gained title, now own extensive areas of range purchased from these settlers or from the railroads. Many of them have land investments amounting to $20 per ewe. Many Montana sheepmen lease extensive areas of range, some of which is on Indian reservations. The competition

[4] Figures from Yearbooks of 1915 and 1919, U. S. Department of Agriculture. The drought of 1919 is responsible for some of the decline.

for Indian lands is such that rents are increasing to a point where the sheepmen can no longer afford to lease them. In the more recently settled portions, the sheepmen are leasing large areas of unpatented homestead lands, especially those recently taken up under the grazing homestead act. In scattered sections, as in east central Wyoming, the sheepmen are still able to operate a part of the year on free range which has been prorated by mutual agreement. Much of this free range is very crowded, and it is probable that many sheepmen will soon be forced out of business.

Because of the limited range, the majority of flockmasters in the High Plains Area are compelled to feed for a period of three to five months during the winter, using either alfalfa or native hay. Those living near enough to the national forests to secure permits endeavor to graze what sheep they can on these areas for a period of two or three months in summer. The sheep are mostly crossbred, except in parts of Montana and Wyoming, where Merinos prevail. The general system of flock management is similar to that described for the Central Range Area.

The California District.

Conditions in California are quite diverse, according to the character of the country in which the sheep are operated. In the northern part of the State, where Merinos are the prevalent type, the sheep are handled in much the same manner as previously described. In summer they are run in national forests and on leased timber lands. Many of them are grazed during the winter months on stubble fields and other waste areas. During the remaining time they are run wherever suitable range can be found, and some are winter fed in a few localities.

In southern California the Basques own a large proportion of the sheep and they run them wherever feed can be found. Many of these sheep are grazed on wheat stubble, in vineyards, and on other farm forage during the winter months. They are usually run on the desert during the spring months and are driven to various places in California and Nevada in search of summer grazing. They are handled in much the same manner as the sheep in Arizona.

The Arizona District.

Owing to a low precipitation in the most of Arizona, the feed is so sparsely distributed that the sheep are obliged to graze over extensive areas. In fact, in the southwest part of the State there are extensive areas of desert land which are inaccessible to live stock. That the sheep may get sufficient feed, it is necessary to move camp every two or three days, and sometimes daily. Instead of using wagons which would generally prove too cumbersome and which are not needed, the camp paraphernalia and supplies are carried on burros,

there being four to six with each band. Each morning the entire camp outfit is packed on the burros, which are allowed to run with the sheep during the day, and unpacked when camp is made at night.

The sheep are mostly run in bands not exceeding 800 to 1,000 ewes and their lambs, or in a "dry band" of corresponding size. There are usually two men with each band, and with every two or three bands a foreman, who is responsible for the general welfare of the sheep. While Mexican herders predominate, there are numerous Basques and some Americans.

Because the brushy character of the summer range makes herding difficult, the Rambouillet type of sheep prevails. Some of the sheepmen breed a part of their ewes to Hampshire rams. These crossbred lambs are sold in July and August. While some go to the Los Angeles market, most of them are sent eastward to Kansas City. The Merino lambs (late) not retained for breeding purposes are mostly sent to eastern feed lots. Occasionally when the lambs do not make a sufficient growth, or the prices are unsatisfactory, they are held over and sold as yearlings.

The Arizona sheep are mostly run on the highlands in the northern part of the State during the summer months. While some are run on deeded land and on Indian reservations, it is estimated that approximately 70 per cent are grazed on the national forests. As water is scarce, it is necessary to build storage reservoirs, where the run-off can be stored. The reservoirs cost from $500 to as high as $15,000 each, the cost varying with the size of the reservoir and with the difficulties of construction.

In the latter half of October or first half of November about a third of the sheep begin to move south and southwestward to the lowland ranges bordering on the desert, where they graze during the early part of the winter. Many of these sheep in going to the winter range are moved over driveways that have been established for that purpose in the national forests. As these driveways are comparatively narrow, and as a large number of sheep must use them, there is not sufficient feed for all and some of the sheep frequently arrive in poor condition. Because of this difficulty, about 30 per cent of them are now shipped by rail. Some of the men who go to the lower ranges have permits to range on the Prescott National Forest during the winter months. This forest will accommodate about 60,000 head, for which a blanket permit is issued instead of restricting them to any one area.

Men using the deserts plan to have the lambs born in February, so that when the winter rains fall they can rush the sheep onto the deserts and avail themselves of the feed, which consists largely of weedy annuals such as alfilerilla, Indian wheat, and pepper grass. This kind of forage lasts for a period of six weeks to two months.

If the rains do not come, as not infrequently happens, the men who have prepared to take advantage of this feed are compelled to work toward the irrigated valleys and buy feed and water for their flocks for the winter, or work back to the foothills and haul water and feed.

These sheep are often shorn before lambing. About the middle of April to the middle of May they begin trailing back to the summer range, arriving about a month later. The rest of the sheep are kept at convenient points where winter grazing can be found, mainly in the foothills and at lower levels in the northern part of the State, where the grazing is spared during the summer for winter use. The lambing season for these sheep usually comes in May.

The New Mexican District.

The sheep in northern New Mexico and southern Colorado are handled in the same general manner as those in Arizona, with two herders to a band and a foreman to every three bands. As much of the country is very broken, the majority of the sheep in this region travel only comparatively short distances in going to and from the summer and winter ranges. A large number of the northern New Mexico sheep are owned by persons of Mexican descent. While some of the Mexicans are comparatively large operators, there are many with single bands of sometimes as few as 600 head. These small operators usually stay with their sheep, acting as herders or camp tenders.

The lambs are born in April and May, and the sheep are shorn in May and June, the time varying with the altitude. The New Mexico lambs do not grow as rapidly as do the northern range lambs because of the scarcity of feed. They usually weigh 50 to 55 pounds when sold in October and November. Most of these lambs are shipped to Colorado and eastern feed yards. Because of their small size, a large percentage of the crop is taken by Colorado feeders, who find them very desirable for a long feeding period.

In southeast New Mexico the sheep are mostly owned by Americans. In this region they are run in what are called "camps." Ordinarily, there are two bands (2,000 mature sheep or 1,000 to 1,200 ewes with their lambs in a band) to a camp. The sheep are grazed out from the camp during the day and brought back at night. A camp usually consists of a foreman who is responsible for the selection of the range and for the care of the sheep, a cook who also acts as camp tender, and a herder for each band. During the winter months, after the lambs have been weaned, a third band is frequently added to the camp. Practically all the help is Mexican.

Considerable difficulty is experienced in getting good lamb crops in southern New Mexico. This is partly because of the limited rainfall during the winter months, so that frequently there is insufficient

succulent feed during the spring months on which the ewes can raise their lambs. Bad weather is also frequent at lambing time and makes lambing precarious. When storms occur at breeding time some sheepmen lamb on the open range, others build small pens with panels and cover these with canvas to protect the ewes during the period of parturition and while they have young lambs. If the storms do not last too long, many lambs are saved in this way. Because of the uncertain lamb crop more attention has been given to the growing of wool, and numerous bands of wethers are frequently retained until they are 4 or 5 years old. During the drought period these largely disappeared. The sheep are of the Merino type; the Rambouillet prevail, because of their larger size and greater hardiness, although a good many Delaines are used.

As there is but little surface water, it is necessary to drill wells every few miles. These add greatly to the expense of the sheep business. Such wells range from 100 to 1,000 feet in depth and cost from $2,000 to $5,000. This cost is often increased by the fact that some wells miss the water.

The flockmasters of New Mexico were in straitened circumstances in 1919. While many of them usually carry loans on their flocks, practically all of them had been forced to borrow heavily in order to carry them through the drought of 1916–1918 and the unusually severe winter which terminated it. During this drought many were forced to ship either all or a part of the sheep elsewhere in order to save them, while others suffered heavy losses from starvation. Nearly all were obliged to buy large quantities of feed, which in many instances cost more than the value of the flocks. During this time the lamb crop, which ordinarily averages about 70 per cent, was unusually low. The crop for 1917 averaged 45 per cent, while that for 1918 averaged 30 per cent. It is estimated that in the Roswell district the lamb crop did not replace the losses for these years.

Southwest Texas.

The main wool-growing section of Texas is in the southwestern part. San Angelo, Kerrville, and Del Rio are the principal wool-shipping centers. Texas retained all of its lands when it was admitted to the Union. These have nearly all been sold to farmers and stockmen. As a result the sheepmen are operating on land which they own or lease from private individuals. These lands are valued at from $6 to $15 per acre, the value depending partly upon the character of the land and partly upon the improvements. Unimproved land is worth from $5 to $10 an acre.

There are two general systems of flock management. In the northern part of this district many of the sheep are handled under the camp system used in southern New Mexico. The only difference

is that they are run on deeded land. In this area, but more commonly in the southern part of the region (tributary to Kerrville and Del Rio), many of the ranchers have in recent years been inclosing their places with wolf-proof fences and allowing their sheep to run loose. While these fences entail a considerable increase in outlay, costing from $250 to $300 per mile (prewar prices), they have proved to be an excellent investment. In fact, this system has been so successful that numerous other sheepmen are planning similarly to inclose their places, and it is probable that in spite of the high prices for material, such fences now costing from $500 to $600 a mile, the majority of the sheepmen will adopt it.

There are a number of advantages in allowing the sheep to run loose. In the first place, one man can look after twice as many sheep as under the herding system. This not only greatly decreases the labor cost but also helps in solving present labor difficulties. But the chief advantage of this system is the increased carrying capacity of the land. Experience has shown that when sheep are turned loose the pastures will carry nearly twice as many as under the herding system, as there is a minimum of feed destroyed by trampling. Not only can a larger number be kept on the same land, but the sheep themselves do much better. The ranchers state that on these fenced areas a great many more lambs are raised, and that the lambs make a better growth. The yield of wool is greater, and the wool is much cleaner than when the sheep are herded. In such pastures there is practically no loss from straying, while the loss from predatory animals is greatly reduced. On inclosed pastures it is necessary to maintain trappers for a time to hunt the predatory animals, but the cost is much less than on the open range, and all the ranchers cooperate in exterminating such animals as soon as any are reported in the district. As the area inclosed by fences increases, the trouble from predatory animals decreases.

Few of the ranchmen run sheep exclusively. In the more northern part of the district where grasses prevail, the range is well adapted to cattle. In addition to the grasses there are numerous other plants, many of which cattle will not eat but upon which sheep thrive. It is, therefore, possible to run a sufficient number of sheep to utilize these weeds without decreasing the number of cattle. In the southern part where there is but little grass, and where weeds and shrubs predominate the cattle largely give way to sheep, and goats are run in addition. Only sufficient cattle are kept to utilize the grasses that the sheep and goats do not readily consume, while the goats in turn use considerable browse that the sheep will not touch. On the very brushy ranges goats predominate.

It is especially noticeable that under the system of inclosed pastures, the sheep are handled in comparatively small units. The majority of sheep raisers have comparatively small holdings of from 5 to 10 sections of land and run from 600 to 1,000 sheep. There are only a few individuals or companies owning as much as 100 sections of land running sheep and these are usually combined family properties, for example in instances where there are several sons.

As in southwest New Mexico, the sheep-raising industry is largely for wool production. Most of the lambs are retained, the ewes being kept for replacement purposes, while the wethers are kept until they are a year old or more. In favorable years the wethers are fattened on winter pasturage and then shipped to the markets in the spring, most of them going to Kansas City and St. Louis.

The lambing season usually comes in April and May, just before shearing time. Approximately one-third of the sheep in this district are shorn twice a year—in April and in September or October. This practice is due partly to the fact that many of the sheepmen believe that because of the climatic conditions the sheep have a tendency to shed their wool if it is not shorn in the fall, and partly to the fact that a good deal of wool is torn off by the brush if it is allowed to grow too long. While such wool, because of the shorter staple, does not bring as good a price, this is partly compensated for by the larger yield that is saved, and also by the fact that the ranchers get their money twice a year—an important item to men operating on a small scale. They get an average of about 8 pounds a year per head.

FARM FLOCKS.

A very large number of the irrigated lands throughout the western States, because of their position relative to the grazing areas, are, as they should be, devoted to the production of feed for the wintering of the live stock that range in the vicinity. This is especially true of the irrigated farms lying in the narrow valleys tributary to vast areas of summer range. On the larger irrigation projects, such as those in the Yakima Valley, Wash., and at Twin Falls, Idaho, it is necessary and more profitable to grow other crops, such as fruit and potatoes. However, successful irrigation farming requires the keeping of live stock in order to maintain fertility of the soil. The growing of alfalfa to be fed on the place helps greatly in maintaining fertility as well as in providing winter feed for the stock on surrounding ranges. Moreover, many of the irrigated farms have areas that are either above the irrigation ditch or too rough for cultivation. They may be utilized as pasture, and sheep can be kept to advantage on them. The best method of keeping under control the

weeds which grow along the banks of the irrigation ditches is to graze them down with sheep. Therefore, in addition to range sheep there are numerous small farm flocks scattered throughout the western States and which are handled in the same general manner as in the fleece-wool States. As yet, these flocks form only a small fraction of the total number of sheep in the Mountain and Pacific Coast States. However, they are increasing so rapidly as to have a decided effect on the general farming systems in many of the larger irrigation districts.

For many years there have been numerous farm flocks in the Willamette Valley, Oreg. These are mostly of the longwool type, which is particularly well adapted to that climate. A number of the flocks are purebreds, run primarily for the production of rams which are sold to the range sheepmen. In the irrigated sections of Montana, Washington, and Idaho, which are of comparatively recent development, the keeping of farm flocks has been increasing steadily during the past four or five years. As there are still many irrigated farms where sheep can be advantageously kept, it is probable that this increase will continue. The sheep are usually found on the larger farms which have from 40 to 80 or more acres. The size of the flocks varies from 25 to 100 head.

A large number of the farms run purebred flocks that are kept primarily for the purpose of producing rams which are sold to the neighboring ranchmen. Hampshire sheep are especially popular on these irrigated farms, partly because they are well adapted to that type of farming, and also because there is a large demand for the rams by range sheepmen. A majority of the flocks are kept primarily for the production of early lambs. Some of these are shipped to the Pacific coast cities, but most of them, especially in Idaho and Montana, are sent to the eastern markets. During the past two or three years numerous associations have been formed for the purpose of pooling the lambs, so that they may be shipped in carload lots. These associations are also pooling the wool.

MOHAIR PRODUCTION.

The leading mohair producing States are Texas, New Mexico, and Arizona, in the order mentioned. Mohair is also grown in parts of California and Oregon, and in other small scattered areas throughout the United States.

The principal center of production is in southwest Texas, in the same general area in which sheep raising occupies a prominent place. In fact, goats are generally associated with sheep, and to a limited extent with cattle. Angora-goat raising is confined largely to the region where shrubby vegetation predominates, the goats (as pre-

viously explained), being kept in order to utilize the browse that other live stock do not care for. In this region only sufficient numbers of cattle are run to utilize the grass which the sheep and goats do not relish.

The goats in this region are handled in much the same manner as are the sheep. They are either run in small bands under the care of a herder or are turned loose in wolf-proof pastures. They are frequently run in flocks of from 100 to 1,000 head, although there are numerous operators who run several thousand.

As the average value of an Angora goat is about two-thirds of that of a sheep ($4 to $5 at the present time), a much smaller capital, outside of the real estate, is needed to engage in the goat business. For this reason many persons who start ranching with limited capital, begin with a flock of 100 goats, or more, and gradually increase the size of their flocks. As sheep have usually proved to be more profitable and as sheep raising is less hazardous, these men, as they become better established, gradually replace at least a part of their flocks by sheep.

The operating expenses are practically the same as for sheep, except that at kidding time it is necessary to hire considerably more help. At this time about one man to every 150 or 200 does is needed for a period of from 30 to 60 days. The young kids are not strong enough to follow their mothers while grazing, and if allowed to run with them are liable to be lost. To prevent this they are kept at the kidding camp, which is located at a point where there is an abundance of feed and water. To prevent wandering they are "toggled," i. e., fastened to a stake by a short rope, which is attached to one of their hind legs. As the kids are very delicate, they are usually furnished with little V-shaped shelters, which they can get under in case of storms. When a kid is toggled its mother is usually kept with it for a short time until she learns its location, and then is allowed to graze, coming back to it at night. After about 30 days the kids are strong enough to be turned loose with their mothers.

The keeping of Angora goats is much more hazardous than the keeping of sheep, as these animals are not nearly so rugged. Furthermore, after the mohair is removed they have no natural protection, and are easily chilled to death if caught in a cold rain. Some operators try to provide shelter, but this is rather expensive, considering the limited use made of it. Even though shelter is provided, when sudden showers come, there is not always time enough to get the goats under it. If caught in the rain they immediately give up, and are difficult to handle.

The kidding season usually comes in April. Ordinarily the kid crop is a little larger than the lamb crop. The 1919 crop equaled

90 per cent, while in 1917 and 1918, because of drought conditions, the crop was only 30 per cent. The kids are usually retained, the does being kept for breeding purposes. The wethers are generally kept until they are four or five years of age, and are then shipped to market, Kansas City being the leading goat market.

The goats are usually shorn twice a year—April and September—shearing about 2 pounds a clip, or about one-half as much as sheep. The kids are shorn in the fall. Fall shearing is necessary, as the goats are inclined to shed if the long hair is not removed. There is also a considerable loss of mohair, and even of the goats themselves, from getting caught in the brush when the mohair gets too long.

During the past few years goat raising has not proved very profitable. In the first place, in 1917 and 1918 the poor kid crop and the heavy expense due to drought conditions caused many operators to get behind. In 1919 wet weather at spring shearing resulted in the loss of many goats. In some cases men who had spent several years building up their flocks had such heavy losses that they found themselves back at the starting point. Again, in the fall of 1919, long-continued rains at shearing time made it impossible to shear many of the goats. Without shearing they were liable to lose the entire crop of mohair. This occurred at a time when money was greatly needed, as many men were still in debt as a result of the drought of previous years.

The goat men of this region figure that they need to get twice as much for mohair as for wool. This is because the operating expenses, outside of interest on investment in the flocks—not considering the greater cost for kidding—is the same as for sheep, while the mohair crop is only one-half that of the wool crop. This estimate does not allow for the greater hazard in goat raising.

New Mexico.

While goats are quite numerous in New Mexico, Angoras form a smaller percentage of the total than in Texas. These are mostly centered in Donna Anna, Sierra, Luna, and Grant Counties where there is plenty of browse. They are generally run in small bands and are handled in much the same manner as are the sheep in southern New Mexico. There seems to be a tendency to discontinue the raising of mohair in this section. There is considerable complaint that prices are not satisfactory, and that although they shear twice a year, there is a market only once a year.

Willamette Valley.

The best mohair is produced in the Willamette Valley, Oreg., and is somewhat finer in quality and of a much longer staple than that of the southwestern States. In this region goats are shorn only once

a year, the fleece weighing about 3¾ pounds. The Angoras are usually kept on farms. They are kept primarily as brush killers, and after the brush has been eradicated there is a tendency to replace them with sheep. The goats eat off the sprouts on the brush as fast as they start up, and this, after a time, will kill the brush.

Other Districts.

In many other parts of the United States, especially in cut-over regions, small flocks of Angora goats are kept principally as brush killers. They also eat some of the weeds, but take very little grass. However, they are not very popular, as they are not only delicate, but under ordinary conditions it is difficult to keep them confined to the farm without expensive fencing.

CHAPTER 10.

COST OF PRODUCING WOOL AND MUTTON IN THE RANGE STATES.

SUMMARY.

The data presented in this chapter are the results of a cost investigation in the sheep industry conducted by the Tariff Commission for the past three years. Reports were received for 92 flocks containing a total of 699,627 sheep in 1918; 46 flocks containing 334,298 sheep in 1919, and 38 flocks representing 385,478 head in 1920.

In addition to this information cost figures are shown for 1910, which were compiled from the report of the Tariff Board on Schedule K, published in 1912.

The results of the investigation are briefly summarized in the following table:

TABLE XXVIII.—*Average receipts, costs, and profits for range States: 1910, 1918, 1919, and 1920.*

	1910	1918	1919	1920
Number of sheep in flocks reported	3,151,731	699,627	334,298	385,478
Pounds of wool per head	6.58	7.98	8.42	8.10
RECEIPTS.				
Total per head	$2.44	$8.79	$9.68	(1)
For wool per pound	.16	.54	.53	(1)
For mutton and lambs (per head of sheep in the flock)	1.39	4.46	5.25	(1)
EXPENSES.[2]				
Total per head:				
Excluding interest	.....	6.64	6.84	$6.79
Including interest[3]	2.43	7.94	8.54	8.41
Allotted to wool, per pound:[4]				
Excluding interest	.....	.37	.36	(1)
Including interest[3]	.16	.45	.45	(1)
Allotted to mutton and lambs[4] (per head of sheep in the flock):				
Excluding interest	.....	3.65	3.83	(1)
Including interest[3]	1.39	4.33	4.74	(1)
PROFITS.[5]				
Per head:				
Excluding interest	.....	2.14	2.84	(1)
Including intrest[3]	.012	.85	1.14	(1)
Per pound of wool:				
Excluding interest	.....	.17	.17	(1)
Including interest[3]	.0006	.09	.08	(1)
Mutton and lambs (per head of sheep in the flock):				
Excluding interest	.....	.80	1.42	(1)
Including interest[3]	.0059	.13	.50	(1)

[1] Receipts for 1920 are not available because only a small portion of the wool was sold by the end of the year. Therefore, no distribution of expense to wool and mutton nor any calculation of profits is possible for 1920.

[2] "Expenses" include a small item for decreases in inventory for the range States as a whole.

[3] Including interest at 6 per cent on total investment.

[4] Expenses for wool (or mutton and lambs) consist, first, of a share of the joint expenses allocated to the product according to the ratio of wool receipts to mutton and lamb receipts for all range States, and second, the direct expenses, such as shearing, chargeable entirely to a single product.

[5] Profits calculated with interest excluded from cost are greater than the true income; and profits calculated with interest included in cost are less than the true income, because of the factor of interest on loans which has not been considered here.

From this table it is seen that the cost of running sheep in 1918, 1919, and 1920 was $6.64, $6.84, and $6.79, respectively, excluding interest from cost. Including interest at 6 per cent on the total investment, the figures were $7.94, $8.54, and $8.40. These latter figures compare with $2.43, expense per head in 1910.

It is impossible to make any estimates of losses or gains in 1920 because only a small portion of the wool was sold by the end of the year. In 1918 and 1919 the profits were $2.14 and $2.83 per head, respectively, excluding interest, and $0.85 and $1.14 for the same years with interest included in cost.

The figures given in the Table XXVIII showing the expenses per pound of wool and per head of mutton and lambs are estimates derived by allocating to each product a share of joint expenses based on the ratio of wool receipts to mutton receipts. Therefore the figures showing a cost of about 35 cents a pound, exclusive of interest, and 45 cents a pound, inclusive of interest, in 1918 and 1919, respectively, are not exact costs of wool but are that part of the total costs of the two products which it seems fair to allocate to wool.

On the whole, the sheep industry seems to have been fairly prosperous during the years 1918 and 1919. No conclusion can be stated as to financial outcome of the operations for 1920. It is clear, for the companies reporting, however, that the cost of running sheep this year has been practically the same as for the preceding two years and that the main items of expense have not fallen in proportion to the fall in the prices of wool and mutton. The Tariff Commission's investigation shows that at all times there are great variations in earnings among flockmasters, not only in different years but also in different parts of the range districts in the same year. In the nature of the case there will always be a certain number of flocks scattered through the country whose cost of maintenance is roughly equal to or even greater than the receipts from them. The sharp decline in wool and sheep values in recent months, however, is altogether abnormal.

Table XXVIII is fairly self-explanatory, but before conclusions are drawn from it some phases of the cost data contained therein should be pointed out. Certain items, often included in cost, are not universally recognized as legitimate running expenses either by accountants or by flockmasters. The most dubious of these items are interest upon the total investment, the depreciation of the flock, and sheep losses, both normal and abnormal.

Because of the many arguments both for and against the inclusion of interest in cost, no attempt is made to settle the question, but the figures for running expenses are presented both with and without interest charges. It should not be forgotten, however, that if interest on the total investment is included in expenses there is a hidden profit

involved which does not appear in the profit column. All of this hidden profit may or may not go to the flockmaster; that depends upon the amount of interest which he has to pay on loans. Conversely, when profits are calculated with interest excluded from cost they are greater than the true net income by the amount of interest actually paid on borrowed funds.

No depreciation has been counted in the cost of production because under normal conditions, or over a series of years, the average age of the flock remains unchanged from year to year by reason of the replacement by young stock of the old ewes sold and lost. From this it follows that so far as this item alone is concerned the value of the sheep per head remains the same throughout the year. Therefore to allow for a hypothetical depreciation either in expenses or by reduction in the value of the inventories is to provide for replacements twice, once in the cost of rearing the replacement lambs (or purchasing young stock) and again in the depreciation charge.

Sheep losses should not be added to expenses because they are automatically taken care of in the changes in inventory values.

After the proper constituents of costs are determined another question arises as to the allocation of them between the joint products of wool and mutton. The method of allocating expenses adopted in this report is based upon the ratio of receipts from wool and from mutton. It is admitted that such a division of expenses is arbitrary and that the cost of wool so determined is only an approximation, but it is one which seems to conform most closely with the common bookkeeping practice of the flockmasters, which, after all, is a definite fact. Moreover, if the comparative advantages of the various types of sheep with respect to either wool or mutton characteristics are determined, the division of expenses between the two products in direct relation to the receipts from them seems the most logical method that can be devised.

The arithmetical errors involved in this method when applied to the individual flocks are largely eliminated, first, by the fact that changes in inventories are taken into consideration in determining receipts and expenditures, and second, that each State is considered as a unit. Therefore individual variations are largely offset against each other.

INTRODUCTORY.

The data upon the cost of producing wool and mutton are discussed under two headings: (a) Details of expenses, with an explanation of the form of the statistical tables used and the derivation of the figures in the various columns; (b) the treatment of significant items of expense, such as interest, replacement and depreciation of the flock, and losses in relation to costs. There is also a detailed discussion of some controversial questions as to the relation of

interest, depreciation, and sheep losses to the cost of production, and also the distribution of expenses between wool and mutton.

DETAILS OF EXPENSE.

The cost figures presented in Tables XXIX and XXX are the result of an investigation by the Tariff Commission, conducted in 1918, 1919, and 1920, partly by field work and partly by scheduled reports. In 1918, 92 companies are represented, in 1919, 46 companies, and in 1920, 38 companies. The number of sheep for which reports were received in each year is indicated in the tables. The data for 1910 were compiled from a report on Schedule K made by the Tariff Board and published in 1912.[1]

The figures in the tables are given by States and by averages for the whole range district. In some cases those for a particular State are not representative; the discrepancies are due to an insufficient number of reports. In two cases—that of Arizona and New Mexico—the reports received were so few for both 1919 and 1920 that they were not considered typical of conditions in those States, and they have been omitted from the State tabulation. They are included, however, in the general average for all States.

Before discussing Table XXX in detail a word is necessary in regard to the comparability of the figures for 1910 with those for 1918, 1919, and 1920. For comparative purposes the data published by the Tariff Board were modified to comply with the premises upon which the present costs are based. The most important change was that in the figures for 1910, made necessary by the different methods used in distributing the expenses to wool and mutton. The Tariff Board obtained the cost of wool by deducting the receipts for mutton from total expenses whereas the present report distributes joint expenses according to the ratio of wool to mutton receipts (by States). In order to make the two sets of figures comparable State ratios for wool and mutton receipts are calculated for 1910 and applied to the joint expenses by States.

The figures for 1910 include 13 per cent of the value of the flock for depreciation and losses, but neither of these items is included in the 1918 or 1919 costs. This difference in practice does not render the figures incomparable, however, for reasons explained in the discussion of depreciation and replacements. Briefly stated, the reasoning runs to the effect that if lambs replace the losses and sales of old stock (the method used in determining costs for 1918 and 1919) no account should be taken of them in the books because the

[1] Wool and Manufactures of Wool—Report of the Tariff Board on Schedule K, vol. 2, pt. 2.

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depreciation and losses will automatically enter into the expense account through the expense of rearing replacement lambs. If, however, the value of all lambs is counted in receipts, whether sold or not (the practice followed by the Tariff Board in 1910), the value of replacement lambs must be charged back to expenses, and if this entry takes the form of a depreciation charge practically the same result is accomplished as if no record were made in the income and expense account for the value of lambs held.

One slight difference in the figures for 1910 as compared with recent years is the fact that rent of land is charged in 1910 in lieu of interest on land. For this reason it is impossible to show the figures for that year with the capital charges excluded from cost. However, the figures shown with interest included in cost for all years are comparable.

A further difference in the figures for the two periods grows out of the treatment of inventories. The Tariff Board used the inventory at the beginning of the year only and counted the lamb crop (whether sold or not) as receipts, whereas the present report considers both inventories and carries the changes in inventory values (due to changes in the number of sheep only) over into the income and expense account. These differences, however, are not great enough to render comparisons misleading, and perhaps they are no greater than the discrepancies in figures submitted by individual owners whose records often are only approximately correct.

One point that must be kept in mind in drawing conclusions from the expenses of running sheep for 1918, 1919, and 1920 is the fact that in the general averages for the range States as a whole and in the figures for some particular States a small expense item is added to cover the decrease in inventory values, based on a decrease in the number of sheep only. It is necessary to take into consideration net changes in inventory if a true profit or loss for the year is calculated, but when the decreases are added to cost the expense account is inflated by so much. If, for example, a man sold all his sheep at the end of the year his profits would be determined by deducting the loss in inventory (value of the flock) plus running expenses, from the total receipts, but his expenses would consist only of such items as labor, feed, etc., and would not include the inventory value of the sheep sold. All this is a commonplace of bookkeeping, but unless it is kept in mind the expense column in the tables may be misleading. This item is not involved in the estimated cost of wool, because in the allocation of expenses to wool and mutton any decreases shown in inventory are charged to mutton and lambs only, to offset the receipts from the sale of sheep which presumably caused the reduction in inventory.

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Three outstanding features characterize the data in Tables XXIX and XXX. The first is the great increase in receipts, costs, and expenses in 1918, 1919, and 1920 over 1910; the second feature is the remarkable similarity of costs in 1918, 1919, and 1920; and the third point of interest is the great diversity in costs in these three years when each State rather than the whole range territory is taken as the unit. The marked similarity in the costs per head for the three years may seem unusual to those familiar with the vicissitudes of the seasons just past—the drought in the Southwest in 1918, and on the northern ranges during 1919, as well as the severe winters of 1918 and 1920. These adverse conditions, however, were mutually corrective in the general averages.

The first two points are best indicated by reference to Table XXIX, showing the aggregate for all States. The first item to which attention is directed is the number of sheep for which reports were received in each year. The number for 1910 is the total of the inventories at the beginning of the year. The numbers for the subsequent years are the average of the first and last inventories of each year. This difference in methods of tabulating inventories has some significance when unit costs per head are calculated.

Another item of some importance is that of the average weight of the fleece for the various years (column 4). In this column it is shown that the average weight in recent years is something over 8 pounds, as compared with about 6½ pounds for 1910. It is not certain, however, that these averages are reliable. Reports were received for a smaller number of sheep in the southern range States in the later years than were reported in 1910. For this reason the averages for the last three years are probably too high to be representative of the whole industry.

In column 5 the sheep investment per head is shown. This figure for 1918, 1919, and 1920 is from two and a half to three times higher than in 1910.

Columns 6, 13, and 18 represent the average receipts per head of sheep, the average receipts per pound of wool, and the receipts for mutton and lambs, not per head of sheep sold but per head of sheep in the flock.

An important omission is found in the absence of receipts for 1920. Very few companies reported any sale of wool and many showed no receipts from the sale of lambs.

Especial attention is directed to columns 7 and 8—the expenses per head of sheep with interest at 6 per cent on the total investment included in cost (column 7), and with all interest and capital charges excluded from cost (column 8). From these columns it will be seen that costs with interest included were something over three times higher in recent years than in 1910. As explained above, the figures

for 1910, with interest excluded from cost, are not available; or, rather, the rent of land in 1910 can not be segregated. The expenses for the last three years, exclusive of interest, run remarkably close together—$6.64 per head in 1918, $6.84 in 1919, and $6.79 in 1920. From these two columns of expenses the importance of the interest charge is seen to be almost decisive. In 1918 the imputed interest was $1.30 per head and in 1919 and 1920 it was $1.70 and $1.61, respectively.

The next columns—9 and 10—in which are shown the profits, are equally important. With interest included in cost practically no profits were shown in 1910—about 1 cent per head. In 1918 they were 84 cents, and in 1919 they were $1.13. Excluding interest from cost, they were $2.14 and $2.83, respectively, in the later years. The profit columns shows a true net income because there is an amount for could not be obtained. It should be remembered that neither of these profit columns shows a true net income because there is an amount for interest actually paid on loans which has not been taken into consideration in calculating these profits. The column of profits calculated with interest included in cost is less than the true net income per head, and the column with interest excluded from cost is greater than the net income by the amount of the actual interest paid on loans. The actual interest charges were not obtained for 1918, but they were 48 cents in 1919 and 33 cents in 1920 per head of sheep for the whole range district. A further point of some importance in its relation to the advisability of including interest in cost is the fact that in 1910, when it is so included, the profits are reduced to nothing. That is to say, in normal times imputed interest charges necessarily tend to offset the profits.

Columns 11 and 12 show a ratio of wool to mutton and lamb receipts. From these figures no fundamental change since 1910 with respect to these ratios can be certainly detected.

Columns 14 to 17, inclusive, showing the expenses and profits per pound of wool, must be considered in the nature of estimates because of the distribution of joint expenses between wool and mutton. The general expenses are distributed to the two products in proportion to receipts from each for the range district as a whole (by States in Table XXX). It seems a remarkable coincidence that the estimated expenses for wool in 1918 and 1919 would be almost identical—45 cents per pound in each case, including interest in cost, and about 36 and 37 cents excluding interest from cost. The former figures are almost exactly three times the estimated expenses for wool in 1910. The receipts for wool (column 13) are accurate, but the estimated profits per pound—about 8½ cents with interest included or about 17 cents with interest excluded—are conditioned on the method used for distributing expenses.

Because of the allocation of joint costs, the expenses and profits on mutton and lambs, per head of sheep in flock, are neither more nor less accurate than similar items for wool per pound. It will be observed in the notes to the tables, however, that the expenses for mutton and lambs include the net decrease in inventory for the last of the year, as compared with the first inventory. This charge is allocated exclusively to mutton and lambs, because in the absence of abnormal losses the decrease in inventories is due to abnormal sales of sheep. This item amounts to 7 to 10 per cent of the total expenses in the three years under consideration.

Columns 23 to 29, inclusive, give the details of expenses per head of sheep. Labor runs around 30 per cent of the total cost; feed, 17 to 20 per cent; miscellaneous items, about 15 per cent; and imputed interest about the same as feed—17 to 20 per cent.

The receipts, costs, and profits by States in Table XXX are much less typical of a given State than are those in Table XXIX for the whole district. Obvious discrepancies are pointed out in footnotes under each State. Almost the only important purpose the State tables serve is to show the possibilities of variation in receipts, costs, and profits in the sheep industry, not only with respect to different years, but for the same year in different localities. In Colorado, for example, in 1918, the total flocks reporting showed an average loss of 47 cents per head with interest excluded from cost. In Montana, in 1919, there was an average gain of only 12 cents per head with interest excluded from cost, but a loss of about $2.25 with interest included in cost. On the other hand, in 1919, Colorado shows a gain of about $4.50 per head with interest excluded. These figures are obviously not typical of the States as a whole, but the discrepancies are ironed out, as it were, in the average figures for the whole range States. The great variations are important, however, as showing the ups and downs of the sheep industry, and it is in the light of these possible variations that the State tables should be examined.

TREATMENT OF SIGNIFICANT ITEMS OF EXPENSE.

There are three items usually regarded as expenses that are especially troublesome in their application to the sheep industry. These are (1) interest, (2) depreciation of the flock, and (3) sheep losses, both normal and unusual winter or disease losses. There is much difference of opinion among sheep raisers in regard to these factors and the items are so large that they deserve special consideration. The inclusion of these items in the expense account, or even any one of them, frequently turns an apparent profit into a loss on the books of the operator. For this reason they are taken up in detail in the order named.

Interest.

An argument often advanced for including interest upon the owners' investment in cost of production is the fact that interest on bonds, mortgages, and loans is a part of fixed charges and that no distinction should be made between this interest and that calculated upon the capital invested by the owner. It is true that no distinction should be made in this respect as to whether the various equities in the business belong to the legal owner or to his creditors, but this argument is not pertinent to the subject. Liability items on the balance sheet are not the proper basis for reckoning interest, but rather the value of the productive assets should be used regardless of the source of the funds with which they were purchased. The validity of the interest charge stands or falls by other arguments than the distinction between owned and owed money, and it is to these arguments that attention is now directed.

Fundamentally, in a competitive régime, interest upon the capital invested in a business is as much a part of the cost of production as any other item of expense, such as the cost of labor or raw material. A true definition of costs should include all items of expense which must be reimbursed in the market price in order to keep up the supply of goods. If a man does not get his interest back on the capital invested he will, in the long run, withdraw from that particular field, and the supply of goods will be reduced as surely as if the prices did not remunerate the direct labor expended upon them.

It will be observed that this conclusion is based upon the assumption of alternate uses for land or capital. If, however, the land can be used only for one purpose the interest upon its value is not necessarily a part of the cost. In Australia, for example, a large amount of the grazing area may be valuable only for sheep range, whereas in the United States most of the land values may be based upon the alternate uses for cattle raising or agricultural pursuits. Under such conditions comparative costs, which include interest on the value of the land, do not represent the respective competitive positions of the different countries.

If there is an alternate use for the land the sheep will be taken off it when falling prices reduce the income to the point where a return is yielded just under the value of the land for other purposes; but, if the land is valuable for running sheep only, the flocks will not be greatly reduced under falling prices until the imputed rent (or interest) on the land falls to zero.

Another important reason for including interest in the cost of production is for purposes of comparing different productive methods which require different amounts of capital investment. A true

comparison can not be made of the advantages of winter feeding as compared with wintering on the open range, of shed lambing as compared with range lambing, nor of the herding system as compared with fenced pastures, unless consideration is given to the capital investment in the various kinds of equipment necessary under these different conditions.

The interest upon the capital equipment becomes especially important for tariff purposes when international cost comparisons are under consideration. If, for example, the Australian flockmasters run their sheep under conditions different from those in the United States with respect to winter feeding, the shearing and classing of wool, or the use of fences instead of herders, there is likely to be in the two countries a difference in the necessary capital investment per head of sheep, which must be equalized by interest charges in the cost of producing wool and mutton.

These general arguments for including interest in cost are cogent and in some cases unanswerable, especially if the values of land and capital are fairly settled and if there is a ready market for them. In the particular case of the sheep industry, however, under the conditions prevailing in the Rocky Mountain States, there are many objections to including interest in cost, some of which grow out of practical difficulties of valuation while others are more fundamental from the economic point of view.

In most of the range States the value of the land is impossible of accurate ascertainment. The original purchase price of it is no criterion because often that was little or nothing. The present market value is uncertain because in many localities the ranch is fit for sheep raising only, and may be so remote from settlement that no market value can be stated. A further complication in valuing it is the certainty or uncertainty of a hinterland, of free range, or of access to the national forests. In many cases the tracts owned are merely the strategic points on the range. A meadow here, a fertile valley there, a water hole or a trail to the national forests in another place, are the several bases of a successful business. How valuable all of these are depends upon the shifts in the tide of settlement.

Still other uncertainties of land values result from the variations in rainfall. Over a large part of several range States there have been three dry years in succession and land worth $15 an acre some years ago is now deserted. Uncertainties of irrigation projects are also disturbing factors in valuation.

It may be objected that although land values and therefore interest charges can not be determined with accuracy, nevertheless a flat valuation for all producers could be assumed and the interest charge made on this basis. Inasmuch, however, as the interest charge

is made primarily to equalize differences in cost growing out of differences in the capital investment nothing would be gained by introducing this arbitrary and hypothetical item of expense.

The practical objection to including interest upon the values of buildings and equipment used in the sheep industry is similar to that of including interest on land. It is difficult to determine these values because of the uncertainties of the cost when they were new, their depreciation, and the cost of replacement. Their values are usually included in the value of the land and no distinction between the two kinds of investment can safely be drawn.

The case of interest upon sheep investment likewise shows a difficulty in the application of theory to fact. If one is interested in the question of relative values of range and blooded sheep, for example, an important item in the comparison is the interest upon the heavy investment in blooded stock. Moreover, the additional sheds and other equipment necessary to keep pure or relatively pure stock involves a capital investment that must be reflected in the expense account by an interest charge. In actual practice, however, the value of the flocks is quite uncertain. Not only is it a question of relative value of range and blooded stock, but the value of the same kind of sheep in a given locality is difficult to determine because of uncertain range conditions on the one hand and the lack of a stable market on the other. A variation of 50 per cent in the market price of the flock during the year may occur. Therefore an interest charge based on market valuation is necessarily arbitrary, and a flat valuation for all sheep is useless for comparative purposes.

In addition to these practical objections to including interest in cost there are more fundamental objections which must be taken into consideration. The first and most important of these is that the value of sheep and the value of land rise as profits increase, and any interest charge on them included in cost automatically tends to wipe out the profits. In the long run it may be presumed that the sheep industry will yield only a "fair" or "normal" return on the investment, and if interest on this investment is included in cost profits will be reduced to something near zero. In other words, no matter how great the net income per head of sheep may be, the value of the sheep, and to a lesser degree the value of the land on which they are run, will increase to such an extent that the "fair" or "normal" interest on these values will absorb the net income. From this it follows that if net income is to be determined no interest charge on assets should be included in cost.

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first place, if the question is one of the comparative advantages of running sheep as compared with other live stock, or of producing grain crops, interest upon the necessary investment should be included in cost in both cases in order to determine the balance of gain. On the other hand, if the net profits in a given industry (for income-tax purposes, for example) are the subject of consideration no interest charge on capital assets should be included in cost.

These alternatives are fairly clear but more difficult questions arise with respect to interest in connection with tariff problems. In any comparison of international costs, such as the cost of running sheep in Australia as compared with the United States, the interest on some of the assets should be included under certain conditions, unless practical difficulties of valuation render the charge uncertain. In general, the interest on permanent equipment, such as buildings and fences, should always be included in cost when international comparisons are being made. The herding system in the United States, for example, with its heavy labor charge, can not be compared with the paddock system of Australia without including interest in the cost of fences. On the other hand, the interest on the value of the sheep should never be included in cost in this comparison because their value in each country will be a result of the profitableness of the industry, and to include normal interest would wipe out the profits in each case and no comparison would be possible.

The case of land is not so clear. If the land is useful in each country for sheep raising only, no interest on its value should be included in the cost, because, like the price of sheep, its value will rise and fall with the profits of the industry and interest charges will render comparison useless. If, on the other hand, the land has an alternate use in either country the interest on the value for the alternate use must be included if the true competitive position in each case is to be determined. If land in the United States, for example, is worth $10 per acre for cattle raising, the American sheep producer will take his flocks off the range in face of competition when the land fails to earn the interest on its value for cattle.

Replacement and Depreciation of the Flock.

The relation of replacement to the depreciation of the flock is even more important for cost purposes than the problem of interest charges. Many men believe that 15 or 20 per cent of the value of the flock should be charged to expenses each year because of a depreciation due to age, regardless of how replacements are made or whether made at all. A charge of this magnitude to the value of sheep in 1919 would overshadow most other items of expense and deserves careful consideration in any cost study of the sheep industry.

Various methods of sheep husbandry with respect to replacement of the flock determine the proper treatment of depreciation. In the majority of cases the flocks are replaced by lambs, usually reared but sometimes purchased, and it is to this method of replacement that attention is chiefly directed in discussing the problem of depreciation. The usual discussion of the question is to the effect that depreciation of the flock is as legitimate a charge to the cost of producing wool and mutton, as is the charge for depreciation of buildings and machinery in a manufacturing plant. If a machine has a probable age of 10 years, 10 per cent of its value should be annually charged to the cost of production. So likewise runs the argument that if a ewe is worth only one-half as much at 7 years as at 2 years of age, 10 per cent of her value should be written off annually for depreciation.

This line of reasoning seems to lead to an inevitable conclusion, but fortunately for the success of the sheep industry the analogy is false. A flock of sheep, unlike a manufacturing plant, is a perpetual organism in that as the old sheep die or are sold a portion of the lambs are added annually to take their place. A true industrial analogy is that of the great railway system. If the system is composed of a sufficiently large number of replaceable units there is no need for a depreciation reserve over and above the annual replacements actually made. If engines and cars are purchased annually as required, if rails, ties, and stations are replaced as worn out, the value of the system as a whole never depreciates so far as its physical condition alone is concerned.[2]

Similarly the physical condition of the flock of sheep is unchanged from year to year, if young sheep are added as old ones are culled out. In this case the expense of replacements is obviously included in the expense of rearing the lambs and to make an additional charge for depreciation is to provide twice for replacement. Therefore, the very expression "depreciation of the flock because of age" is wrong, for if lambs replace the old ewes lost or sold the average age of the flock does not change from year to year.

If replacement lambs are purchased instead of reared their cost should be charged to expenses because none of the expenses of rearing lambs are for the benefit of the flock, but are incurred exclusively for market lambs. This method of replacement involves no depreciation, however, and none usually is made by the men who replace their flocks in this manner.

[2] As a matter of fact all railways do keep a depreciation reserve under the rules of the Interstate Commerce Commission, but replacements are charged to this reserve instead of directly to expenses—a legitimate bookkeeping device by which annual charges to profit and loss for replacement are uniform. In the case of a flock of sheep this scheme can not be applied because the cost of replacements (rearing the lambs) can not be separated from the other expenses of running the flock.

There are cases in which a depreciation charge is justifiable, however, one of which is the practice in some localities of buying a whole flock of young stock and holding them three or four years for the wool. Whether the entire flock is sold as old stock after several years or whether it is replaced from the lamb crop as it becomes old, there is a depreciation in the value of the flock for a number of years which should be reflected in the expense account by a depreciation charge until the flock is sold or until the replacement with young stock brings the average age to a constant figure each year.

The method of treating depreciation in the report of the Tariff Board in 1912 deserves special consideration. Under the title of "Inventories and Depreciation" the report says in part:

> The value of the stock on hand at the beginning of the fiscal year as reported by the owner has been accepted.
>
> It has been assumed that, on an average, after producing five lambs a ewe will be replaced and that she is then worth about one-half as much as at two years. Therefore, a depreciation of 10 per cent has been allowed for breeding ewes * * * For breeding rams * * * a 25 per cent depreciation has been allowed.[8]

From this passage alone it seems that the present method of excluding depreciation from cost is exactly the opposite of the practice of the Tariff Board. As a matter of fact, however, because of certain assumptions which do not appear in this quotation the Board was correct in its treatment of depreciation and sheep losses. It will be observed from the quotation that only one inventory—that of the beginning of the year—is taken into consideration by the Board. Furthermore, in the discussion of receipts it is explained that they include the value of all lambs raised regardless of whether they are sold or not. From this it follows that the receipts from the flock are greatly increased over what they would be if only surplus lambs were included in receipts.

Offsetting these high receipts there must be a charge for replacing the flock. Perhaps the best way to do this would be to charge back to expenses the value of the lambs held. In lieu of this charge, however, the Tariff Board counted annually 13 per cent of the value of the flock for depreciation and losses—a method that in the long run is not in error.

In the present discussion, as will be shown in more detail below, both inventories, the beginning and end of the year, are considered and only the net changes in the inventories are carried over into receipts or expenses. Therefore, if the lambs exactly replace the ewes sold or lost, no account is taken of them either in receipts or expenses, and the same result is obtained as if the value of all lambs

[8] Report of Tariff Board, Schedule K, p. 10.

were credited to receipts, and a depreciation charge were made to expenses equivalent to the value of the necessary replacement lambs.

In theory, then, at least the final cost figures in the Tariff Board's report and in the present report are comparable so far as depreciation is concerned, but in actual practice the present method of considering inventory values at the beginning and end of the year rather than only one inventory, with the value of all lambs included as receipts, is more accurate and the better accounting practice.

Sheep Losses in Relation to Costs.

The question of sheep losses is perhaps even more important, especially in some localities, than the problem of depreciation. It seems obvious to most sheep owners that their costs are greatly increased when a blizzard catches a flock on the range and destroys a large portion of it, or when predatory animals raid it, or when any one of a dozen other catastrophes that may occur depletes or almost wipes out the flock.

It is indeed true that all of these losses must be accounted for in determining the cost of wool and mutton, but they should not be included in expenses merely by an arbitrary book entry. Like the case of depreciation from age, there are several questions involved in the problem which require analysis.

In the first place, lamb losses give some difficulty because of the confusion between losses at lambing time and those that occur during the summer and fall. Most men are inclined to say that lambs lost in the lambing season are not cost items, but that losses on the range are properly chargeable to expenses.

Obviously such a distinction can not be made because no line can be drawn between the two periods. Any attempt to differentiate them is likely to lead to the absurdity that a lamb is not a lamb until it is 5, 10, or 30 days old, a question which depends upon the judgment of the bookkeeper.

As a matter of fact, lambing losses are not chargeable to cost. They are a reduction of the income from the flock rather than a positive expense. If a man obtains a 60 per cent lamb crop his expenses are no larger than if he obtained a 90 per cent yield, but his returns are reduced in the same sense as if he has but a 60 per cent (of normal) wool clip.

The same reasoning applies to lamb losses during the summer and fall. If, at the end of the season, only 900 lambs return from the range instead of a normal number of 1,000, the expected income from them is reduced 10 per cent, but this loss is not chargeable to expense because it is obvious that misfortune should not be multiplied (on the books) by charging the value of the lambs lost to expenses when the losses already have cut down the expected receipts.

If it be admitted that lamb losses are not chargeable to expenses there remains the further question of the losses of mature sheep. The lamb crop is considered an income item, a yield or return from the capital invested in the flock, but once the lamb account, or a portion of it represented by replacement lambs is closed into the sheep account, new problems seem to arise with respect to losses. Those problems largely grow out of the conventions of bookkeeping, however, rather than out of fundamental differences between losses of lambs and mature sheep.

The proper accounting methods with respect to mature sheep have been covered, by implication at least, in the discussion of replacement and depreciation. If 10 per cent of the ewes are lost each year and are replaced by lambs there should be no book entry for this loss because it is made good in the expenses of rearing replacement lambs and to add the loss to expenses counts it twice. No distinction in this respect should be made between depreciation and death due to age. Whether a ewe has depreciated until she has a cull value of $3 or has died and has a pelt value of $2 makes a difference of $1 in the receipts, but no difference whatever in the expenses of running the flock.

It may be admitted that normal losses of mature sheep are not chargeable to the expense account, but the problem of abnormal losses from blizzards, disease, or starvation may be troublesome to the accountant as well as to the owner of the flock. It seems quite obvious that calamitous losses of these kinds add to the cost of producing wool and mutton in this country, and therefore should be included in the expense account of individual producers. So they should in the long run, but probably not in the expenses for any one year. An analogy to heavy sheep losses is a loss by fire or explosion in a manufacturing plant. A fire loss may amount to 50 per cent of the total value of assets and three or four times the net earnings for the year, yet dividends may properly be paid out of the proceeds of the year's operation. The conventional method of treating such a disaster is to charge off only a portion of the fire loss to expenses each year until it finally is eliminated from the books. So likewise should heavy sheep losses be written off, a portion each year, until the decrease in capital assets is made good out of earnings.[4]

METHODS OF RECORDING REPLACEMENTS, DEPRECIATION, AND SHEEP LOSSES ON THE BOOKS.

To one not familiar with bookkeeping, it may seem a difficult task to cover, in the cost records, the various assumptions discussed above in regard to replacements, depreciation, and losses. As a matter of

[4] In the present investigation practically no unusual losses were reported. Therefore, this complication does not affect the cost tables in this report. It was not practicable to prorate previous losses where they had occurred in the recent past.

fact, however, the accounting is relatively simple, so far at least, as the number of entries is concerned, and, without explaining in detail the reasons for each step, the bookkeeping methods with respect to the items under consideration may be outlined as follows:

1. If sales of old stock and losses are annually replaced by the addition of young stock, the inventory value per head should be the same at the end of the year as at the beginning because the average age of the sheep is unchanged.

2. If market prices are tending upward or downward year by year, a revaluation should be made the first of each year to conform somewhat to market conditions. An inventory surplus or deficit account should be created in the balance sheet to offset the change in capital assets.

3. If for any reason the herd is allowed to deteriorate from age, a depreciation charge should be made to expense or it should be made clear that some of the sales (if no replacements are made to offset them) are a return of capital invested instead of a true income from the flock.

From these rules it follows that, except in the third case cited, any change in inventory will be due to changes in the number of sheep only and not to a change in the value per head. Any change in the value of the flock in any given year, therefore, is a true loss or gain and as such should be carried over in the profit and loss account.

A decrease in inventory, however, should not be charged to expenses, when the cost of running the flock rather than the net profits is the subject of consideration.[5]

DIVISION OF EXPENSES BETWEEN WOOL AND MUTTON.

One of the most difficult problems to be solved in this investigation is the division of expenses between wool and mutton. With the exception of the cost of shearing and a few incidental expenses for wool only, all the expenses of running the flock are joint costs, chargeable both to wool and to marketable sheep. Strictly speaking, therefore, there is no such thing as the cost of wool as a separate product. In all cases it is an estimated or attributed cost. This point must never be lost sight of in any discussion of the cost of wool in its relation to the tariff problems. Positive statements about its costs are convenient modes of expression, but are no more accurate than the premises upon which they are based.

If all costs for the several products of the herd—wool, lambs, ewes, and pelts—are estimates, the basis of the estimations or allocations is a matter of prime importance.

For the purposes of the present inquiry, wool and mutton are considered true joint products, and as such should share expenses jointly.

[5] For a further discussion of this point, see p. 207.

The particular method of distributing expenses between them that has been adopted is based on the ratio of receipts from one to those from the other. If, for example, receipts from wool are 60 points and the receipts from mutton 40 points, the wool is charged with 60 per cent of expenses and mutton with 40 per cent of them.

One apparent rather than real objection to this method of distributing expenses between wool and mutton is based upon the fact that there are great differences in the ratio of receipts for the two products according to whether the lambs are added to the flock or are sold and whether many or few mature sheep are sold. This objection is met, first, by the fact that increases and decreases of inventories are taken into consideration in figuring receipts and expenses, and, second, that the individual flock is not the unit in the cost tables, but rather each State is considered as a whole in calculating the ratio of wool and mutton receipts. In this manner accidental variations from the normal relation between the receipts for the two products are largely eliminated.

CHAPTER 11.

THE MARKETING AND HANDLING OF WOOL IN THE UNITED STATES.

TYPES AND GRADES OF DOMESTIC WOOL.

Wool Grades.

Wools are graded in the trade chiefly according to diameter and length of fiber. On the basis of diameter (quality or fineness) the grades used for range-grown ("Territory") clips are fine, fine medium, half-blood, three-eighths-blood, quarter-blood, low quarter-blood, common, and braid. Wool grown east of about the one-hundredth meridian—i. e., farm or "fleece" wools [1]—is graded usually as "XX," "X," half-blood, and as above for lower qualities. "XX" and "X" fiber of superior length is known as fine Delaine and Delaine.

On the basis of length the division is into "combing" and "clothing." Combing wool is used in the Bradford (English) system of worsted manufacture, in which nearly all the shorter lengths are combed out as "noil," while the fibers are laid parallel in making the "tops," which is the first stage in the manufacturing process after scouring. Strictly clothing wools are adapted only to carding, by which process the fiber is laid in every direction, interlocked or felted, and are manufactured into "woolen" goods. Noil, which is the by-product of combing, and mill waste in general, are used with clothing wools in making some woolens.

In actual buying at original points, the term "combing" often is replaced by the terms "staple" or "Delaine" in referring to fine wools of superior length. Staple applies to fine Territory clips which are not less than 2¾ inches in length. The term Delaine was formerly applied to fine "fleece" or farm-grown wools mainly from the Ohio district, New York, and Michigan, and approximately 3 inches in length; but the term is now used to designate fine combing fleeces in general from the above areas, and is often applied to considerably shorter fiber. It is particularly apt to be applied to wool which is somewhat finer than the bulk of the wools classed as fine, because this finer wool can be spun to as high a count (fineness)

[1] Sometimes also referred to as native, eastern, or domestic. In this chapter the term domestic is applied to the United States clip as a whole.

as can a somewhat longer but coarser fiber. In view of comparatively recent improvements in mill machinery, however, staple and Delaine, as used under the old, strict, length classification, really represent special classes of combing fiber. In market dealings the term combing generally refers to wools more than 2 inches long, and the coarser the wool the greater the length required to class as combing.

After wool reaches the large marketing centers, where practically all the grading has been done, a further division as to length is often made. The longer wools bought as "clothing" may be separated out into an intermediate "French" or "baby" combing grade, though not necessarily designated as such.[2] Fiber of French length is usually referred to in the trade as "top making" wool. The term "French combing" is properly applied to wools of half-blood or higher quality (fineness) and "baby combing" to those grading three-eighths-blood and lower, but in practice these terms are often used interchangeably. When made, these intermediate grades are based solely on length, and comprise wools approximately 1½ inches or more in length, while Bradford combing fiber is about 2¼ inches and longer. French combs can work wool shorter than 1 inch, but such fiber is not usually combed because of the large percentage of noil made. A greater length is required for French combing in wools grading lower than half-blood, for otherwise the filling and knitting yarns made from them would not have the requisite strength. This is partly due to the less pronounced crimp of the coarser wools, but primarily to their greater diameter of fiber.

Whether or not any grading is done in the case of fine clips depends largely on the price offered for such clips in the original bags. Grading of the more uniform of these wools would sometimes result in a loss, and more frequently in no profit above the cost of the grading. Whether it is profitable to separate French combing from strictly clothing and staple lengths in an individual clip may depend more on the keenness of demand for combing wools than on the percentage of French combing which the clip contains. Manufacturers of woolens can always use and are glad to get a little extra length in their carding wools. Then, too, it is in woolen goods that the great bulk of the reworked wool stocks is used. When wool prices are high, and a manufacturer of woolens tends to use a large proportion of substitutes for new wool or to vary his mixture so as to include more of the cheaper wools, it then pays him to buy wool the higher grade of which contains a considerable amount of the longer fiber, to go into his mixture. His fabric is thus maintained at the desired level of quality. On the other hand, when wool prices are high many of the

[2] See Chapter Note I, p. 249, for detailed discussion of intermediate grades.

topmakers and spinners are less particular about the percentage of short fiber present in wools that are combed into a short top. Improvements in combing machinery now make it possible to use in the manufacture of worsteds a large amount of fiber which formerly was worked up into woolens.

Clips of crossbred wools vary too widely to make sale in the original bags practicable. They are graded, therefore, before sale to the mills, and original package business in them practically does not exist. Most crossbred clips average somewhat longer than finewools, and in general they are somewhat less frequently thrown into intermediate grades than are finewools. Save occasionally in the case of purchases by small local mills, fleece-states wools do not enter into original package business. Individual clips are not large enough to make it practicable.

Producers and others agree that there should be a greater degree of standardization than now prevails in wool grades. It is undoubtedly true that a rigid standardization is impossible, because of the range in qualities within each of the grades of those that are at present recognized in the trade. But it is equally true that an approach to a fixed standard can be closer than has yet been made. In its investigation of wool-grading practices, the Bureau of Markets of the United States Department of Agriculture found that wools assigned to the same grade by representative dealers and mills sometimes differed in fineness by as much as one and one-half grades. In its endeavor to promote uniformity in grading wool, the Bureau has established tentative minimum lines between grades. These minimum lines have been favorably commented on by representatives of every branch of the trade. Tentative bases for division as to length have also been issued. These are subject to modification, but they have also received favorable comment from both dealers and manufacturers. They are presented in the following table:

TABLE XXXI.—*Bases for tentative length divisions in wool grades.*

[U. S. Department of Agriculture, Bureau of Markets.]

Grade.	Clothing.	French or Baby combing.	Strictly combing.
Fine	Under 1½ inches	From 1½ to 2 inches	Over 2 inches.
One-half-blood	Under 1½ inches	From 1½ to 2½ inches	Over 2½ inches.
Three-eighths-blood	Under 1½ inches	From 1½ to 2½ inches	Over 2½ inches.
One-quarter-blood	Under 1½ inches	From 1½ to 2½ inches	Over 2½ inches.
Low one-quarter-blood	Under 2 inches	From 2 to 3 inches	Over 3 inches.

Common and braid wools are so rarely shorter than 3 inches, and are so rarely sufficiently weakened by the various things that cause "tender" wool, that there is no necessity for suggesting a "baby combing" class for them.

Types of Domestic Wool.

That part of the domestic clip produced west of the one-hundredth meridian is known in the trade as "Territory" wool, except that grown in Texas, California, and Oregon, which is known by the name of the state where produced. Arizona and New Mexico wools also are generally classed separately. The term "Territory" as applied to the remainder of the range clip is a relic of the time when the country west of the Missouri River and the State of Missouri constituted the Territories. Western Oklahoma wools are mainly of combing length, and they grade chiefly half-blood and finer. They are usually sold with wools from northwest Texas. Wools grown in the western part of the Dakotas, and occasional clips from western Kansas and Nebraska are often sold as "Territories," to which they are similar. Territory wools are classed as staple or combing and as clothing, and according to diameter of fiber in each class are put into the commercial grades noted above. When graded at points in the range region there is now a tendency to throw the fine and fine medium together, also the quarter-blood and low quarter-blood. Braid wool is a lustrous variety shorn chiefly from pure-breds or very high grades of certain longwool breeds, such as Cotswolds, Lincolns, and Leicesters, and luster is one of the principal features distinguishing braid from common.

Merino blood is present to a greater or less degree in Territory wools, but the amount of Merino blood in the sheep has little relation to the grading of fleeces below fine medium. An example is half-blood wool, which may be shorn from a first-cross finewool-Leicester sheep, but more often is taken from an animal carrying only one-quarter or less of longwool blood. Not all sheep of such breeding shear wool of this grade or quality.[3] Of the "fleece" wools, nearly all the Delaine, "X," and finer clips are grown in southern Ohio, and contiguous parts of Pennsylvania and West Virginia. Appreciable amounts still come from parts of Michigan, New York, Indiana, and southeastern Iowa, and small amounts from other areas. In fleece wools that grade below Delaine and "X," the breed of sheep which produces the wool is a matter of no particular significance. Blood terms as used in wool grading have for the past 70 years referred primarily to type and fineness of fiber.[4]

Characteristics of Eastern Wools.

The bulk of the clip east of the ninety-eighth meridian is "bright" wool—i. e., it carries relatively little discoloring foreign material.

[3] Quality is a term applied in strict usage to the diameter of fiber, and the "spinning count" of the yarns obtainable from wools of a given degree of fineness provided they are of combing length. In common parlance as applied to wool, the term "quality" is used to denote factors really pertaining to the "character" of the fiber, such as soundness, strength, and softness.

[4] See Chapter Note 2, p. 251, for origin of blood terms as used in wool grading.

In and somewhat eastward of the Great Plains, however, a large part of the clip is quite dark in color when shorn, owing to the character of the ground on which the sheep graze, and is known as "semibright." These wools come from Oklahoma, Kansas, Nebraska, parts of Missouri, Iowa, and the Dakotas, and areas in Minnesota, Wisconsin, and west central Illinois. The darker color is their chief distinguishing feature; they scour out white.

Aside from the finewool region of the upper Ohio Valley, fleece wools largely grade below half-blood and are chiefly of combing length. This results from the predominance of the Down breeds of sheep and the favorable conditions for making a good growth. The chief exceptions to this statement are portions of the clip of southern Michigan, northeastern Indiana, and southeastern Iowa, and of some scattered areas elsewhere. In these areas finer wools, mainly combing, are grown. Western ewes secured by growers in the farming States shear some half-blood wool and some fine wool, but a majority of their fleeces grade three-eighths or lower. Wools shorn from fed western lambs and sheep are normally better grown than Territory wools shorn in the sections whence these sheep and lambs came. They grade from fine downward and are not typical of the fleece-wool clips. They are often graded as "western" when sold at points of origin.

Virtually no fine wool is produced in the South. The Kentucky clip, largely a low three-eighths combing, leads in quality, with Tennessee and Virginia wool, which includes that from western North Carolina, as a close second. At points of origin these wools usually are divided into piles as free, slightly, medium, and hard burry. "Georgia" and "lake" wools are typical of the tidewater sections, and in general embrace the clip of the seaboard and Gulf States south of Virginia. There is little difference between the two, as they are shorn from the nondescript sheep common to these areas, save as modified locally by recent breed improvement. They are usually free from bur, except when run on fenced fields, but are "run-out" and uneven. Approximately 70 per cent of the clip is three-eighths wool, and most of the remainder goes as quarter-blood. Owing to the character of the grazing, a considerable portion is often of clothing length, but the greater part is normally of baby combing length.

Improvements in Preparation.

Since 1910 in practically all the fleece-wool region there has been a considerable improvement in methods of handling the wool at and after shearing. Formerly sisal twine was generally used for tying the fleeces. The loose twist of such twine permitted some of the fibers to become mixed with the wool. These fibers could not be combed out, and being of vegetable origin they did not take the dyes used, and serious defects in the finished fabrics resulted. Such twines

have now been largely replaced by hard jute and paper cords. There is also now a more general removal of tags (dung locks) from the fleece before sacking, and much less refuse material finds its way into individual fleeces and bags than formerly was the case. Entirely too much cotted, burry, and seedy wool is still grown. A corresponding depression is reflected in the prices at country points.

Poor methods of preparation, paint bands, general sacking of all grades and colors together, and use of improper twine, besides other factors of small individual importance, are said to have constituted a "fixed charge" of 1 to 3 cents per pound against domestic wools on the prewar price basis.[5] This applied equally to both farm and range-grown wools. Such a charge can only be eliminated by persistent and long continued effort on the part of the producers—effort, however, which primarily entails attention to minor details. The small amount of time required would be well rewarded by the increased value of the wool. It is known that there has recently been some improvement in this direction.

Characteristics of Southwestern Wools.[6]

Texas and California wools have a characteristic elasticity, strength, fineness, and felting property which distinguishes them from those of the northern ranges. The Texas clip usually is deemed the more desirable. Double shearing—spring and fall—in southwest Texas and southern and central California results in the production of a large proportion of quite short, though very desirable wools. The clips of a year's growth are mainly of French combing to staple length. Normally a large portion is of staple length, and many individual clips run largely to staple. The better of the 12 months wools, more especially in Texas, are fairly comparable to Ohio Delaine in quality, length, and condition. The shrinkage, seasonal and local, is quite wide, and sometimes extremely so, and has a corresponding effect on prices received by the growers for their wool in the grease.[7]

Arizona wools in general have the same characteristics as those just mentioned, but they run somewhat shorter than a large part of the Texas and California twelve months. Otherwise they are equally as good as those of Texas and California. The shrinkage has nearly as wide a seasonal and local variation. A large proportion of the New Mexico clip lacks the strength, evenness, and quality of the other southwestern wools, but locally it is of good character and condition.

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[5] The Wool Grower and the Wool Trade. Bulletin 206, U. S. Dept. of Agriculture (1915). This bulletin goes into extreme detail as to wool preparation.

[6] See Chapter Note III, p. 252, for a detailed discussion of regional wool types.

[7] See Table XXXII, p. 225, for effect of shrinkage on wool prices.

In all four of these States, save for the Navajo and similar relatively unimproved wools of Arizona and New Mexico, much the greater part of the range-grown fiber grades half-blood and higher. To a considerable extent it is sold in the original bags (ungraded) by dealers or commission houses that buy from or handle it for the growers. Farm-grown wools of Down or crossbred type are a negligible factor in the production except for a few areas in California and in northern and central Texas.

Navajo and similar wools are produced in flocks owned almost entirely by the Indians. They range in grade from No. 1 (about half-blood), No. 2 (three-eighths-blood), No. 3 (quarter-blood), to No. 4 (carpet wool). Another grade is "low gray," a combination of all colors largely added to by the buyers, who endeavor to separate colored wools from the white, usually sacked together by the Indians. Grades 2 to 4 contain more or less kemp or dead hair, which does not take the dyes and therefore is objectionable. Before the war kemp depressed the price to the grower by several cents per pound. In the 1919 price this discount was more than doubled.

Characteristics of Northern Range Wools.[8]

Oregon is the only State north of the southwest whose clip is usually classed separately from the Territory wools. Valley (western Oregon) clips are chiefly farm grown and are very similar to fleece wools in grade, character, and condition. They are all bright wools of combing length, and similar range-grown wools, which shrink more in scouring, are often interlotted with them. Wools grown east of the Cascade Mountains are less even in grade than formerly, but still run largely to half-blood and higher grades. Normally they are almost entirely of combing length and have as variable a shrinkage as those in other States, though they are somewhat "heavy" (high in shrinkage). They scour a good white and enter mainly into the manufacture of fine worsteds.

Territory Wools.

The Washington clip differs from that of Oregon chiefly in its somewhat higher shrinkage. Nevada wools also run very largely half-blood and higher, as the ranges in most areas are poorly adapted to crossbreeding. The shrinkage is rather heavy, and the wool is short, mainly of French combing length, but it scours to a good white and is "soft" to the touch. In northern Utah crossbreeding is almost universal and the range in wool grades is wide. The clip is mainly of combing length and is usually of good character. South of Utah Lake finewool sheep are run almost exclusively. The greater

[8] See Chapter Note IV, p. 255, for a detailed discussion of northern range wools.

part of the range is too dry to turn off a fat lamb, and no cross-breeding is attempted. The wool is similar to that of Nevada in grade, but normally is slightly longer and has a lower shrinkage. Although there are many excellent flocks in Colorado the wools in that State are variable in grade, shrinkage, and character. Some breed improvement has occurred in recent years, and the term "breedless," sometimes applied to the clip in years past, is no longer generally applicable. The clip is largely of combing length, with a moderately heavy shrinkage, but remains the least desirable of the range wools.

Idaho wools are mixed in grade, and most of the higher qualities are produced in the western part of the State. The western county wools are somewhat longer than those in the central district, but shorter than those in the southeast part. The clip as a whole, however, is almost entirely of combing length, and, in the estimation of the trade, ranks with that of Montana and Wyoming. Montana wools are somewhat lighter in shrinkage, and are less even in grade than formerly. They scour to a creamy white, which makes them unfit for use in pure white goods, but are fairly "soft," strong, of good length, and are preferred by many mills to the clips of the other two States just named. Wyoming wools are the strongest of the Territories, have a wide range in grades and shrinkage, scour to a good white, and are almost entirely of combing length.

General Character of Western Wools.

Western wools in general have a higher shrinkage than fleece wools, and are not so strong, largely because of the weakening influence of alkali in the dust picked up. The alkali makes most of the wool harsh to the touch, and when present in extreme amount the wool is often "tender"—i. e., wastes too heavily in combing or is so weak that it can not stand the strain of combing. Such wool, of whatever length, can only be sold as clothing wool, and frequently is less desirable for woolens than sound short wools. The great bulk of the range wool, though somewhat harsh, is stronger than much of the soft, fine Australian fiber (as distinct from the strong or robust Australian types), which, in the manufacture of worsteds, is sometimes mixed with American wools of Delaine type to give more pleasing appearance. Generally, however, the Territory wools are not so strong as Australian fiber, and they "noil" more in combing. Australian wools as a rule work a little better in the machines, and sometimes the Territory wools are said to be more "wasty."

EFFECTS OF CLIMATIC VARIATIONS AND SHRINKAGE.

The difference between a highly desirable and a mediocre clip in the range country depends to a considerable extent on seasonal

climatic variations. One year the range is poor and an unduly large part of the clip is of clothing length and in poor condition. The next year, with a good range, the same bands may produce a clip containing a preponderance of well-grown, good-conditioned, staple fiber. It is an exceptional year in which at least one range area of more than merely local extent is not more or less seriously affected in this way.

Shrinkage has been the most important factor in determining the value to the grower of the wool in the grease. Sheepmen in areas where high shrinkage wools are grown have a serious handicap to overcome in their competition with sheepmen in the lighter shrinkage areas, and, as has been indicated in the preceding pages, a very large proportion of the western sheepmen are so handicapped. Just how important the shrinkage is may be readily seen by a glance at Table XXXII. Most causes of shrinkage are beyond the control of the sheepman. Continuous high winds on a sandy range before shearing may cause a shrinkage of over 70 per cent as a result of the extra dirt blown into the wool, while the same sheep next season may give a clip shrinking 10 per cent less. A good snow blanket on the winter range usually makes a difference of 2 to 5 per cent in the shrinkage, as the snow keeps down the dust and sand. A sand or dust storm at shearing time, however, may nullify in an hour or less all the benefit derived from a snow blanket which lasted for months.

Another cause of shrinkage is the frequent use of large shearing plants to which the sheep are trailed for shearing. The number of such plants is steadily decreasing with continued agricultural settlement in and near the semi-arid country, because settlement makes them less accessible by restricting the driveways. Furthermore, the increasing demands of the shearers' unions have led many growers to install small plants near home where they can shear with the local labor supply. Some sheepmen feel that too many of the large plants are still in use. Owing to the character of soil and vegetation in most range areas, by the time 50,000 sheep have passed through one of these large plants the forage for miles around has been entirely consumed and the ground has become nothing but a dust bed. Each additional band then goes through a period of partial starvation while in the vicinity of the shed, and each fleece removed has picked up from 2 to 5 per cent more dirt than otherwise would be present in the wool.

Range wools usually shrink so highly that different buyers' estimates of the scoured content often vary from 1 to 4 per cent. When wool shrinks in the neighborhood of 70 per cent it is very difficult to estimate the scoured content with accuracy, and the buyers therefore place it low enough to protect themselves. This is particularly

true when the foreign matter is composed largely of white or very light-colored sand, for then the eye is of little use in supplementing the sense of touch. It is less true when the foreign matter is composed chiefly of red or dark-colored sand, and still less when silt predominates. Anything which burdens the fleeces with foreign matter lessens the net return to the grower, because of the greater estimate of their shrinkage made by the merchants. Shearing at very large plants usually has this effect, and in areas where the sheep have to be trailed over long stretches of dusty country to reach the sheds this condition is aggravated, and therefore buyers are still more conservative in their estimates of the scoured content.

The influence of shrinkage on the price paid for wool in the grease is shown in Table XXXII. This table shows the effect of shrinkage on the price as sold in the warehouse, but disregarding the cost of the scouring operation. The buyer, when bidding on a lot of wool, really calculates the grease wool price from his "scoured limit" price according to the shrinkage. The latter may be estimated, a test lot may be scoured, or the sale may be made subject to a guaranteed shrinkage. From the price thus obtained he deducts the cost of scouring. The prices shown in the table for grease wool, therefore, must be further reduced by a very small amount to cover the cost of scouring. When the buyer has a lot of wool offered him at a given price, in the grease, he multiplies the grease price according to the shrinkage and then adds the cost of scouring to ascertain the clean scoured cost, and thus determines whether or not it is within his scoured limit price. The first line in the table shows the percentage of shrinkage in scouring. The double lines, reading across the page, show (1) the price on the clean scoured basis, (2) the price in the grease for wool of different shrinkages. Thus a lot which shrinks 50 per cent and is worth 90 cents per pound scoured is worth 45 cents in the grease. If it is worth $1.40 scoured, its grease value is 70 cents. If a lot is worth $1.40 scoured, but shrinks 80 per cent, it is worth only 28 cents per pound in the grease. When wool is bought at points of origin, the price in the grease is figured on the same basis, but with further deductions to allow for all marketing, shipping, and handling charges, tags, blacks, bucks, burry, seedy, etc.; and a further deduction is made to allow for the buyer's profit in the transaction. At the same time the shrinkage is estimated somewhat hastily, conditions usually are not favorable to very great accuracy, and the higher the shrinkage the higher the buyer places it in order to be on the safe side.

TABLE XXXII.—*Effect of shrinkage* [a] *on price of wool.*

[Price per pound.]

	Shrinkage.				
	40 per cent.	50 per cent	60 per cent.	70 per cent.	80 per cent.
Scoured	$0.70	$0.70	$0.70	$0.70	$0.70
Grease	.42	.35	.28	.21	.14
Scoured	.80	.80	.80	.80	.80
Grease	.48	.40	.32	.24	.16
Scoured	.90	.90	.90	.90	.90
Grease	.54	.45	.36	.27	.18
Scoured	1.00	1.00	1.00	1.00	1.00
Grease	.60	.50	.40	.30	.20
Scoured	1.10	1.10	1.10	1.10	1.10
Grease	.66	.55	.44	.33	.22
Scoured	1.20	1.20	1.20	1.20	1.20
Grease	.72	.60	.48	.36	.24
Scoured	1.30	1.30	1.30	1.30	1.30
Grease	.78	.65	.52	.39	.26
Scoured	1.40	1.40	1.40	1.40	1.40
Grease	.84	.70	.56	.42	.28
Scoured	1.50	1.50	1.50	1.50	1.50
Grease	.90	.75	.60	.45	.30
Scoured	1.60	1.60	1.60	1.60	1.60
Grease	.96	.80	.64	.48	.32

[a] In connection with the above table, the average shrinkage in the range States is of interest. No range State average shrinkage is of value save in a very general discussion, but for purposes of general comparison they are here given: Texas, 65; Arizona, 64; New Mexico, 67; California, 64; Oregon, 66; Washington, 68; Idaho, 62; Montana, 63; Wyoming, 66; Colorado, 62; Utah, 63; Nevada, 68. (Averaged from figures prepared by the U. S. Dept. of Agriculture and published in Annual Wool Reports, Bulletins of the Nat'l. Assn. Wool Mfrs., 1915–1920, inclusive.)

In connection with the consideration of shrinkage, prices for standard grades of wool are shown in Table XXXIII. This table presents the prewar average (Boston, October–December) and the 1919 price (Boston, October only) for standard grades of both fleece and Territory.[b] In studying this table it must be borne in mind that there was a decline from the price level of 1909, which was not recovered from until 1915 and not even then in all cases. It should also be borne in mind that the Ohio grade of "fine" as compared with Delaine is mainly of French length and is in large part combed. The same is true of fine Territory clothing as contrasted with fine staple.

TABLE XXXIII.—*Prices* [a] *of standard grades of wool, prewar average and 1919 prices.*

Standard grades of wool.	Grease basis.		Scoured.	
	Average 1909-1915.	1919	Average 1909-1915.	1919
Ohio, Pennsylvania and West Virginia:	*Cents.*	*Cents.*	*Cents.*	*Dollars.*
Fine Delaine	27½	85½		
Fine	23½	68½		
Half-blood	29½	81½		
Three-eighths	29½	68½		
Quarter-blood	29½	65½		

[a] Approximate.

[b] From Boston Market Reports for October to December, in Bulletins of the Nat'l. Ass'n. Wool Mfrs., vols. 40–46 and 50.

TABLE XXXIII.—*Prices of standard grades of wool, prewar average and 1919 prices*—Continued.

Standard grades of wool.	Grease basis.		Scoured.	
	Average 1909-1915.	1919	Average 1909-1915.	1919
	Cents.	*Cents.*	*Cents.*	*Dollars.*
Territory:				
Fine staple	22	64½	64½	[b] 1.90
Fine clothing	19½	54½	56¾	[b] 1.65
Medium staple [c]	23¾	54	59½	[b] 1.35
Medium clothing [d]	20	45½	52¾	[b] 1.20
California:				
Fine 12 months	.....	.....	56½	1.81¾
Fine 6-8 months	.....	.....	51½	1.61¾
Fine 6 months (free)	.....	.....	48½	1.31¾
Fine 6 months (defective)	.....	.....	30½	.....
Texas:				
Fine 12 months	.....	.....	60¾	1.90
Fine 6-8 months	.....	.....	54¾	1.62½
Fine 6 months	.....	.....	49½	1.52½

[b] Another statement as of Oct. 1, 1919, places fine staple at 64½ cents grease ($1.83, scoured); French combing at 59 cents ($1.73½, scoured); fine clothing at 50½ cents ($1.53, scoured); half-blood combing at 66½ cents ($1.75, scoured); half-blood clothing at 60 cents ($1.66½, scoured).—National Wool Grower, October, 1919.
[c] The former medium grade is now often quoted as half-blood, three-eighths-blood, and quarter-blood.
[d] An estimated figure used for 1915 in drawing the average.

CROSSBREEDING AND EFFECT ON CLIP.

Unevenness is characteristic of most of the Territory clip, both of individual fleeces and of the bands as a whole. The extent of it varies with the quality of the animals mated to secure the first-cross progeny, and subsequent skill in selection of crossbreds for breeding toward or away from the Merino base. Longwool rams have practically been exclusively adopted for crossing on the Merino ewes for the production of stock sheep. Skillful breeders using purebreds of desirable type secure first-cross animals of high quality, with a minimum of divergence in fleece. Further crosses made continuously toward either parent breed represent successively less violent blood infusions and the development of grade animals of one or the other original breed. A minimum of culling is then necessary to maintain fairly even bands, the members of which are relatively uniform. Such breeding, however, is not often practicable, and when pursued away from the Merino for a number of years a switch back to a fine-wool base is usually thought necessary to restore foraging and herding propensities. In different range areas different proportions of longwool blood are considered necessary to adapt the sheep more nearly to their local environment. For instance, in parts of western Wyoming, sheep with three-fourths of mutton blood are deemed the logical sheep to run. In parts of southern Idaho and Oregon half-bloods are believed to be best adapted to the range. In parts of Nevada animals with more than one-fourth of mutton blood are said to be too soft for the severe range conditions under which they must live. Opinions on these points are apt to vary somewhat with the price of fine as compared with the price of medium and lower wools.

When half-blood sheep are desired, and are bred by the sheepman himself in order to maintain a flock as close as possible to the standard desired, the more open-wooled first-cross ewes retained in the flock are mated to Merino rams to "tighten" the wool. The result is a three-quarters-blood Merino. This animal is usually bred to a longwool ram to give three-eighths of finewool blood. The "tight"-wooled first-cross ewe is usually mated to a longwool buck, and the resulting one-quarter-blood is bred to a Merino ram to produce a five-eighths-blood Merino. In each case there has been first a very violent crossing of blood lines, then one much less violent, followed by another almost as abrupt as the first. With each cross individual sheep show more and more divergence in fleece, whatever the quality of ram used and the skill displayed by the sheepmen. Few careful men care to breed beyond the third cross in striving for half-blood ewes. They endeavor to discard all ewe lambs of undesirable type. Even if all progeny of the third-cross ewes normally is disposed of, however, unusual ewe and lamb losses during a severe winter often force the retention in the flock of lambs which normally would be culled out. Unevenness in the band is thus accentuated. Most sheepmen are not breeders in the accepted meaning of the term, and therefore do not exhibit the skill in selection for breeding which is essential. Many of them also use grade rams of unknown parentage, whose tendency to beget widely divergent offspring further complicates their breeding problem. Their sheep usually show an extreme unevenness in fleece and in band.

In very recent years a long step forward has been made by some of the more careful breeders, and by the United States Department of Agriculture, in an endeavor to secure and maintain crossbred bands of fairly uniform type. Desirable first-cross ewes have been mated with first-cross rams and the progeny carefully culled before further breeding to maintain evenness within the band. Such a system violates the conventional breeding theory, but is working out very well when proper selection is used. Many sheepmen are of the opinion that a better type is now being evolved for American range conditions than is the Corriedale, developed along similar lines in New Zealand.

The unevenness of the crossbred clip, both in the individual fleece and in the band, depresses the price to the producer slightly below what otherwise would be paid. It so happens, however, that wools grading below half-blood have sold in the grease for more than the finer grades for many years (aside from the abnormal market in 1919 and 1920). The range sheepman, therefore, has not really lost in wool values as a result of his crossbreeding. On the whole he has gained, because crossbreds from animals of good type actually

shear more wool on the same range than either parent breed, and the fleeces have a lower shrinkage than fine clips show in the same area. In fact the sheep on the American ranges to-day, if the character of the range is considered, are not surpassed in weight of fleece by the flocks of any other country. The average clip in Australia, with its year-round grazing and generally superior range, was 6.89 pounds per head for 1914 to 1918, inclusive. For the same years the average clip per head in the far Western States, where crossbreeding is generally practiced, was 7.55 pounds. The average shrinkage of these wools was 64 per cent in scouring, the Australian (skirtings, bellies, etc., included) approximately 57 per cent, leaving the scoured content of the Australian fleece only one-fourth of a pound heavier than the American. The reason for crossbreeding by the range sheepmen, however, was to secure heavier, more desirable market lambs, in order more nearly to compete with foreign wool producers. Their heavier clip from crossbred bands has been a further and most welcome addition to the total receipts.

PREPARATION OF TERRITORY WOOLS.

The preparation of the wool on the ranges has shown marked improvement during the past 10 years. It is estimated that not over 5 per cent of the sheepmen now use improper twine in tying, and buck and black fleeces are generally sacked separately. Not over 10 per cent of the outfits sort their bands before shearing, but those who do so are chiefly the larger growers who thus shear and sack in fairly uniform lots. A small but growing number of the sheepmen sack separately the tags (dung locks), buck, black, dead, and burry and seedy wool. Not over 5 per cent of the sheepmen grade the fleeces at the shearing shed. The remainder sack the wool as it comes from the sheep's back.

Wools shorn in high altitudes, particularly from sheep which have not been wintered on grassed range, are usually "ripe" unless shearing is done in a rainy period. That is, they gain in weight (from 1 to 2 per cent as a rule) when shipped to be stored in warehouses in more humid regions, as in Boston. This ripeness is rarely considered by buyers at range points, but because of the absorption of moisture, such wools when consigned frequently bring enough additional return to offset the loss of interest until the wools are paid for.

Grading on the Range.

Much has been said in favor of grading at the shearing shed as increasing the price received by the grower. One of the chief benefits of this practice has been the education of the sheepman in wool grades. It has been estimated that not over 1 grower in 50 knows the percentage of his clip by grades and its average shrinkage in scouring.

Most of them speak of their wool as "fine" or "tight," and "medium" or "loose."

Both dealers and commission men believe that the most practicable place to grade the wools is at the market centers, where "line" fleeces (those of a quality midway between two well-defined commercial grades) are thrown into the higher or the lower grade, according to the trend of the market at the time. The dealers frequently even regrade their own grading in response to changes in market trend or special demands from certain mills for narrow lines of a given quality for which a small premium is offered. Most houses have a special clientele of customers whose desires frequently necessitate very close grading of at least a part of their stocks as regards quality, length, or both. Quite often a firm has all the wool for prospective sale to a given mill "thrown" by one grader whose work more closely conforms to the desires of such mill. To make sure that the wool offered really fills the requirements, a sample is frequently first worked up in the mill.

In some range areas the wools have so high a shrinkage and are so unsightly that grading is virtually of no value. Skillful buyers often vary from 2 to 4 per cent in their estimates of shrinkage, but they all estimate sufficiently high to protect themselves. Wools from "original package" areas seldom gain by being graded at the shearing shed. These clips are usually fairly uniform, and rarely contain an appreciable percentage of wools below half-blood, save in the case of occasional crossbred clips of superior quality and breeding. Many mills prefer such wools in the original bags because they know that the "cream" has not been graded out of them, and that other somewhat similar but less desirable wools have not been graded into them. For this reason some mills pay a small premium for the more desirable original package wools, and this premium is usually reflected in the price paid the grower by the wool buyer. Dealers, commission men, and many growers state that nothing more than removal and separate sacking of tags, buck, black, dead, and burry and seedy wools, is really necessary in these areas to secure the maximum price for the clips.

In most crossbreeding sections, however, the educational value of wool grading to the producer is in itself believed by many growers to be sufficient to warrant its adoption. Accurate knowledge of grades serves as an excellent check on fleece deterioration of individual or band, and therefore is of great value as a check on breeding operations as they affect the wool. Aside from this educational value, the chief advantage of range grading is the aid furnished to the buyer in estimating the real shrinkage, percentage of clip by grades, and the proportion of blacks, bucks, burry, seedy wool present. This is especially applicable to very uneven clips.

Limited Adoption of Australian System of Fleece Preparation.

In recent years a number of producers have adopted the Australian system of "skirting and classing" their wools, which are then baled before shipping. This is a much greater refinement in handling at range points than the grading of the clips on broad commercial lines with no alteration of the original fleece other than removal and separate sacking of tags. In Australia the flocks have for generations been bred along standardized lines, and extreme care in the selection of breeding animals has been almost universal. As a result the fleeces in Australian finewool regions have become standardized on the sheep's backs so far as this is possible. At shearing time the animals in the various paddocks are carefully sorted in order that the bands reaching the shearers at any one time may be further standardized. In crossbreeding areas the fleeces are less even, but it is usually practicable to sort the animals for a standardized shearing run because of the size of the flocks. The skirting of the fleeces removes the less desirable portions, and the skirted fleeces are "classed" into many more grades than are used in the simpler American system of grading. Selling brokers sometimes class small crossbred clips after arrival at their warehouses.

The buyers of the world compete at the provincial and London auctions for these Australasian wools. A large proportion of the British and of some Continental spinners manufacture a very limited variety of yarns, and desire wools classed on technical lines. The demand of American buyers for light shrinkage wool during the long period of the protective tariff, has also been a factor in making this system of handling the clip practically universal in Australasia. The high degree of specialization by Belgian and German firms in carbonizing and manufacturing the "off-sorts" supplemented the specialized demands of other buyers. A highly refined system of fleece preparation is logical in a region which produces so much wool bred along standard lines, manufactures so little, has specialized world demand to supply, and is located so far from the manufacturing countries.

American Grading Versus Australian Classing.

The somewhat technical subdivisions within grades when wools are classed on the Australian system are not understood by most sheepmen on the American range. A majority of the better-informed sheepmen are of the opinion that the educational value of range classing to the grower as indicating desirable changes in breeding or in culling out less profitable individuals is no greater than simple grading on the broad commercial lines in vogue in the trade. The men who have adopted the Australian system, however, appear to be

perfectly satisfied with its educational value to themselves, as well as with the price received for their wools.[10] They also expect it to assist the American growers to compete with the Australian.

METHODS OF SALE ON THE RANGE.

The wool grower has three methods for disposal of his clip. He may sell it on contract in the fall or winter to a buyer, either a local man or the representative of an eastern firm. He may sell it by private treaty at the shearing shed after shearing to these buying agents or to one acting directly for a manufacturer, or, he may consign the clip to a firm for subsequent sale on commission. This firm may buy wool on its own account, or it may do a commission business pure and simple. A variation of the second and third methods consists in the pooling of their wool by a number of growers and sale by private treaty at producing centers, sale by auction at such centers, or consignment as above.

Sale on Contract.

When range-grown wool is sold on contract in the late fall or winter, a part of the purchase price usually is advanced by the buyer at the prevailing rate of interest. He protects himself from unusual deficiencies in the clip by clauses in the sale contract. Furthermore, the buyer does not contract for wool in advance of shearing unless he is confident that the ensuing market will be strong and that the price level will be superior to that at which the contract was made. Owing to his intimate connection with and knowledge of the manufacturing demand and of foreign trends in the trade, he is in a position to forecast the domestic market with far greater accuracy than individual growers. He governs his contractual purchases accordingly. This method of sale is more common in Utah and Nevada than in other range States. In some winters as high as 80 per cent of the Utah and Nevada clip is sold before shearing. Owing to unusual market conditions 90 per cent was so sold in the winter and spring of 1916-17, but usually not over 50 per cent is disposed of in this manner. In some years the percentage is as low as 10.

Sale at Sheds After Shearing.

In years when the market is active, wools purchased at the shearing shed during or after shearing usually are strongly competed for by the buyers. Shed buying may be affected by unduly high-price demands on the part of the growers. In such cases experienced buyers mark time until the demands are modified and they usually affect indifference as to purchase until what they consider a reasonable bargaining level has been reached. Concentration of market demand on more or less definite types of wool vitally affects the competition for other types. Buyers then do not

[10] See Appendix, Hearings, pp. 489, 538.

care for the undesirable types except at prices sufficiently low to insure against loss, and indifference as to purchase at the prices often asked is very real indeed. Entire areas may then experience but little competition on the part of the purchasing agents. In such cases the buyers readily accept consignments.

Sale by Consignment.

When the market promises to be unsteady or to experience a decline during the ensuing season, wool dealers generally curtail their contractual purchases and limit their buying at range points to clips which can be bought so low that the danger of loss is reduced to a minimum. Wools which it is believed will be most unfavorably affected by the trend of the market are sometimes entirely neglected by most buyers. The buyers' bids, as contrasted with the growers' demands, are often so low that the latter will not even consider them. Consignment is then in order.[11] The grower usually figures that he will secure more for his wool. The buyer figures that his firm can not lose, because the sheepman has assumed the risk. This is not always true, because advances made on the consignment occasionally (though rarely) are greater than the value of the wool when it is later sold to the mill. In normal years it sometimes happens that competition at range points for especially desirable clips forces a buyer who can not pay the price set by the growers to accept such wools on commission with a "guaranteed advance" representing nearly or quite their full value. This is done to maintain good relations with the growers, generally men with whom the firm has had extensive dealings, as well as to secure the type of fiber wanted by certain mills in order to keep them steadily on the selling list. Such wools are usually sold as soon as possible in order to protect the advance made on them. In consignment years advances are more closely scrutinized. In general, however, the buyers have contracted for the wools or purchased them at the sheds in the years when it was most profitable for them to do so, and have taken them on consignment in years when contractual or range purchase promised to result in a loss. The dealers have thus dominated the situation to a considerable extent, and greatly to the disadvantage of growers who had to sell quickly to secure needed funds, but sheepmen in a position to hold their clips indefinitely have been very lax in the sale of their wools.

It is a common saying in Boston that "consigned wools make a weak market." In years when a great part of the wool clip is con-

[11] 1900, 1903, 1908, 1910, and 1920 have been consignment years during the past 21 years. In 1918 the wools were consigned under control of the Government, but not because of any market weakness. In the other years since 1900 it has been estimated that approximately 90 per cent of the range clip was sold at points of origin.

signed the market undeniably has been weak. The consignment of the wool, however, primarily is the result, not the cause of the weakness. But the fact that a large part of the domestic supply has been consigned tends to accentuate any weakness which may be present. The heavy volume of consigned wools represents an uncertain quantity. The growers may become impatient and demand immediate sale of enough wool to depress the price for all wools. A tendency often develops to move the wools more rapidly than they normally sell, and this tends to cause lower prices. The amount thus sold varies with the insistence on sale by consignors, the interpretation of the market by firms, and the degree of price decline sustainable before the margin between advance or purchase price and selling price is wiped out. No reputable dealer deliberately sacrifices consigned wools.

Associative Sales.

The method of wool sale through a " pool " formed by range growers has been a common practice in certain areas. The most prevalent method of disposal of pooled wools used to be by sealed-bid auctions. This has decreased with the growth in number of small outfits, many of which were not strong financially and wished to sell quickly, and with a general necessity for purchase of considerable areas of land by the growers as a result of the extension of homesteading into semi-arid sections. As open ranges became limited in extent, such investment in land was obligatory to secure partial or complete control of contiguous range areas, as well as to obtain deeded lands for spring and fall grazing and for winter feed production. These investments have tied up capital, while increasing costs from other causes have forced the sheepmen to borrow heavily each year, the loans usually to be repaid after shearing or after sale of lambs in the fall. The need to sell very soon after shearing thus became more general, and a smaller proportion of the producers have been in a position to pool their wools. A much more important factor has been a pronounced increase in the number of local buyers operating for the large wool houses. Many of these firms now maintain permanent western representatives at central range points. Constant activity of these local and regional representatives, together with better transportation facilities by both railroad and automobile, which have greatly extended the operations of itinerant buyers, have sharpened competition for the wool. Although the sealed-bid auctions of former years are held occasionally in scattered range areas, they have largely disappeared.[12] The chief exception is in Texas, where merchants and bankers still sell a large part of the clip for the producers, either by auction or private treaty.

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[12] See Appendix, Hearings, p. 514.

A further factor is the operation of a number of commission firms which do not buy wool on their own account. Until 1920 these have been used by the growers more largely as a club to force up prices at sales at the sheds than as a large factor in the direct marketing of wool. One of these, in New Mexico, commands great respect in the trade. Its operations doubtless would be considerably strengthened if it sold the wools chiefly in market centers. Another operates largely in Arizona, but with headquarters in Boston. Two others offer competition on the northern ranges, one having headquarters in Portland, the other in Chicago, but both have branches in Boston. A fifth, with headquarters in Boston, handles little but wools put up on the Australian system.

Growers' Disadvantage in Marketing.

The woolgrowers in general have bargained with men possessed of much fuller information concerning the individual, the regional, and the national clip, its present, and its probable future value, than was possessed by themselves. The dealers chart each year the percentage by grades of each clip purchased, the shrinkage within each grade, the percentage of all classes of less desirable fleeces (bucks, blacks and burry), and every detail affecting the value of the wools. They also keep themselves thoroughly posted concerning climatic variations as affecting the clip. Their buyers, therefore, quite apart from a superior knowledge of the market, start out with far more knowledge concerning the grade, shrinkage, and character of the clips of any given locality than is possessed by the great bulk of the producers. The sheepmen have usually consigned their wools when the buyers were not especially anxious to buy. But when buyers were competing sharply to secure the wools in anticipation of an advance, the growers sold their clips on the range. Most dealers freely admit that consignment of their clips year after year would show larger returns to the growers over a series of years than any other system of sale. All state that they should either sell at the shearing shed every year for the best price obtainable, or should consign every year in order to secure the largest net returns. Dealers point out that wool houses of good standing, with heavy investments of their own in similar wools and with an established clientele of mill buyers, are so situated that they can handle consignments to the best advantage, and that competition in the trade, as well as the desire to maintain active and friendly relations with the growers, constitutes an excellent protection of the growers' interests. The growers, however, often feel that the dual character of the dealer's business—that of consignee as well as of merchant—is inimical to the producer's best interest, particularly in view of the condition of the market in most consignment years. Many persons actively inter-

ested in the marketing of the domestic clip, but who do not themselves deal in wool, believe that, if consigned, the wools should be sent to firms which do a commission business exclusively. Such firms have no interest in the consignments other than the growers' interest, and are in a position to dispose of the wool to good advantage.

THE RANGE-MARKET PRICE SPREAD.

However the wool is sold, there is normally a considerable spread between prices offered for the product on the range and the price at which it is later sold, or resold, in market centers. In a season with a fairly steady upward trend in the market the difference usually is quite wide, by reason of the interval between range purchase and resale to the mill. This has characterized the five seasons ending in 1919, though it was largely applicable only to half-blood and finer wools during 1919. The range-market price spread may be exceedingly wide, however, if there is an unusual turn in the market demand. This was especially the case with the finer wools in 1919. If the wools are contracted for before shearing, the contracted price is generally somewhat lower than that which the same wools bring at the shearing shed because of the greater risk due to the longer period in which an unlooked-for change may occur. The longer this period the more chance there is for error in interpretation of the market.

Another reason for this spread is the restricted season of active wool marketing by the producers. The bulk of the domestic clip moves from points of origin between about May 1 and July 15. The period of greatest price variation up or down at the shearing shed extends from April to July. The marketing season is usually preceded by a brief period of more or less "bearish" statements on the part of the trade as to the outlook. The purpose is to act as an offset against ideas of the producers as to the value of their wools. As soon as buying starts, the prices offered at range points vary according to the condition of the market.

After the wool is purchased the greater part of it is carried by the dealers for periods which vary from three to nine months subsequent to its arrival at the warehouse. The chance of unlooked for changes in the market increases with the length of time that the wool is held. There has to be a spread in price to care for this risk, as well as to cover the actual cost entailed. When the wool is finally sold it is on 60 days' time, with 1 per cent discount for cash paid within 10 days. In some instances a much longer time is allowed the mills before settlement is required. This is another factor which adds to the cost of marketing. Sale on 60 days' or more time has prevailed for practically three-quarters of a century.

Basis of Prices at Range Points.

The price offered at range points is based on the estimated scoured content of the wool in the grease. Buyers have fixed scoured limits on the various grades delivered at the seaboard or other market centers. From such limits they work back to the value in the grease at the shearing shed. The grease price for any grade varies with the estimated shrinkage and with other factors. For instance, a well-grown, half-blood staple wool, free from bur and seed and of moderate shrinkage, is worth much more than a half-blood staple of the same shrinkage but not so well grown and marred by bur and seed. Two lots of the same grade, both free and well grown, but with a 5 per cent difference in shrinkage, have a proportionate difference in grease value. One house may have special orders for wools of a certain type which enable it to pay more than another for such clips. Such a firm merely bids above the others by a sufficiently large fraction to secure the clips desired. The aim, of course, is to buy all wools at as low a price as possible. It is a common practice, however, when a skillful buyer is leaving a district in which he has secured more wool than his rivals, but where a considerable amount of desirable wool is left, to "plug the market" by purchasing a number of clips above the prevailing price level. This is done in order that no other dealers buying in the same area thereafter may buy the wools for less. No other dealers can then undersell the first buyer without curtailing profits or incurring a loss.

In this connection it should be noted that wools are practically always sold to the mills in the grease and at an agreed price per grease pound. The mill buyer also has a clean scoured limit price from which he works back to the price in the grease. He estimates the shrinkage just as did the dealer on the range. If there is too wide a discrepancy between dealer's and mill buyer's estimate of shrinkage, samples of the wools may be scoured in order to determine more nearly the clean scoured content, or else the wool may be sold subject to a guaranteed scoured content.

BUYING TECHNIQUE ON THE RANGE.

As a rule buyers first endeavor to secure the less desirable wools in a given area before going after the best clips. This helps to establish a price level for that locality above which, if necessary, they can later go to secure the more desirable clips. If the best wools were bought first, the remainder of the sheepmen would want the same price for their wools; wool in the grease is really worth considerably less. Unless wools are pooled for sale by private treaty at a uniform price, or unless the buyer is an inexperienced man, it is the rule that wools of superior character and condition command a higher

price than other clips of the same grade. As it actually works out, however, the less desirable wools often bring a little more than they are worth, while in most years the better clips generally sell for a little less than their real value. When sold at sealed-bid auction, or consigned, this is not the case.

In most areas there are one or more local men who have a pronounced influence on sales. These may be sheepmen, merchants, bankers, or they may combine two or more of these activities. The less influential woolgrowers frequently rely on their advice to a considerable extent, and follow their lead in selling. The buyers often endeavor to secure such men as their local agents, paying a small commission on wools purchased by their firms in that area. These agents can and do influence local sales to a considerable extent. This is especially true in the case of bankers, owing to their extensive financing of the sheepmen. Bankers in general are in a position to have fairly full information concerning the market. The banker, however, usually tends to be somewhat conservative in his interpretation of the market, as he has to consider the safety of his loans, which prior to and for a time after the shearing season normally are extended close to the limit of his facilities. Advice which he may give as to sale of the wool may therefore vary somewhat from that which would be given by another person not burdened with such securities and often leads to sales at prices lower than could later be secured if the wools were held in the corrals or consigned. Some bankers, it is said, have been unduly influenced in their advice by commissions secured as agents for wool houses. But a banker's real interest requires that he protect his clients to the fullest extent of his power, in spite of the fact that he may secure a commission of one-fourth cent per pound. The commission is of negligible importance when the safety of the loans made to the sheepmen is considered. The more advantageous the price received for the wool, the safer are the loans. Most of the criticism appears to apply to certain areas where there are a great many shepherds, mainly aliens, with little or no permanent investment other than in sheep. It sometimes happens that the investment in sheep is so heavily mortgaged that the grower is owner in name only. In such localities the local banker has to be watchful to protect his loans and to secure their liquidation as early in the season as possible. To do this he sometimes has to insist on sale of the wool at the first opportunity to secure what he considers a reasonable price. In occasional years, when the wool market is such that loans in general are considered unsafe, such insistence is more general, but this is exceptional. In general, bankers act only in an advisory capacity.

Wool buyers often frankly exchange notes as to their buying limits. Within reasonable limits they usually operate on a live-and-

let-live principle, but this is not necessarily at the expense of the grower, who can usually consign his clip if he desires and get a substantial advance on it. Men able to bid more than others do not run the price higher than is necessary to get the most desirable clips. They thus "plug the market" quite effectually. If they ran up their bids unduly, the price demanded at other points would be elevated to a level which would permit the purchase only of relatively small amounts of wool during the balance of that season. Two men who trust each other fully may agree to split a clip and present identical bids, but they have to compete with others to secure the wools. Buyers from different market centers are present in most range areas during the wool marketing season, frequently mill buyers as well, and trade jealousy is an active factor in stimulating competition. As has already been pointed out, however, in seasons when the market is uncertain or on a decline these competitive factors may be weak or absent, unless the demand is strong for certain types of wool. Few wool houses then care to deal extensively in fiber on which a loss is probable. Even in active years over-night code messages received by the buyers may largely or entirely halt buying if the market develops an unexpected turn.

MARKETING OF FLEECE WOOLS.

The marketing of the fleece wools differs from that of the range clip primarily in the method of collection at points of origin. This part of the domestic clip is produced in small units on the farms, and a considerable portion is grown in areas where sheep are present in small numbers. In such light shearing sections there is not as much competition as in range regions or in fleece States areas where sheep are numerous. In general the fleece wools are first assembled by country merchants and other local purchasers, who frequently buy on commission for wool firms operating in these areas. These firms may be located at country points or may have headquarters in the central markets. At times the local buyers operate for mills, and both mills and central market firms often send representatives to supplement the activities of their local agents, to whose credit funds for the purchase of the wools are placed in local banks. They have usually bought for a commission of 1 cent a pound. When enough wool has been collected at one point to warrant shipment, the lot is forwarded to the market center and graded by the firm which purchased it. If the wool is bought on his own account by a local merchant, he may consign to a central dealer or sell to an itinerant buyer representing such a dealer.

These local buyers, except for occasional firms or individuals, usually have rather limited knowledge of wool grades. In areas where

the clip is of considerable size their knowledge of such matters has to be fuller than when the clip is small and competition is slight. In the latter localities wool is "just wool," and all is bought at one price, save in the case of clips, or portions thereof, which are so palpably out of condition, burry or seedy, that the reason for a discount is meridian it varies from 1 to 3, sometimes 4 per cent, according to in exchange for store credit, and are able to control the price to a large extent. In areas where the wool clip is of moderate to large size the price is based on grades, but normally little or no difference is made between desirable and less desirable clips of the same grade. A premium offered on good wool usually renders it impossible to secure much other wool except at practically the same price. The careless shepherd generally profits somewhat at the expense of the good flockmaster, who rarely secures all that his clip is worth. A discount of from 10 up to, in some cases, about 20 per cent is taken for burry and seedy, cotted, dead, and buck fleeces, and tags, and to allow for the shrinkage which occurs when fleece wools are shipped and stored in cool warehouses. This shrinkage, due to the "greenness" of the fleeces as a result of shearing under humid atmospheric conditions, sometimes while the belly wool is damp from dew, is characteristic of the fleece wools and even of Territory wools from sodded range areas if the altitude is not too great. East of the one-hundredth meridian it varies from 1 to 3, sometimes 4 per cent, according to conditions when the wool is shorn.

Previous Neglect of the Wool Clip.

Indifference to wool grades, particularly to the cause and the costliness of poor condition and quality, and also extreme carelessness with regard to these points, have for many years been widespread in fleece-wool areas outside of the finewool sections. About two-thirds of the flock receipts have come from the sale of sheep and lambs. Growers have greatly neglected their wool and overlooked the effect of pelt values on the live-weight price of animals sold. Improvements in type of sheep kept have of late years somewhat offset a part of this neglect, but until the past two years the object of such improvements has been the securing of better lambs rather than wool. The shepherds overlooked the fact that although wool was a secondary consideration in their flock receipts it was quite feasible greatly to improve the return from the clip by greater care and by better selection of good rams without prejudice to the quality of lambs secured. The recent trend in wool prices (up to May, 1920) has accentuated the importance of wool and should overcome the former disregard of this phase of sheep husbandry.

Associative Selling or Pooling.

The recent development of cooperative wool sales by pooling the clip and sale at strategic assembling points to dealers or mill buyers,

or by consignment to a firm at one of the central markets, has received considerable attention in recent years. It was widely practiced in 1919. A considerable number of the Iowa wool growers and a smaller proportion of those in Illinois shipped their clips to a central market commission company with excellent results. The net increase in price to the grower ranged from a few cents a pound, in areas where considerable wool was produced and competition normally was fairly sharp, to several times as much in sections where less fiber was produced and less competition was the rule. Similar results were secured on practically 2,000,000 pounds of wool in Ohio, which leads in the development of State wools. Excellent returns were also secured in numerous counties in other States. These cooperative activities forced up, to a considerable degree, the prices paid by all local buyers. In certain counties this principle of cooperative wool marketing has been in vogue for several years. One local club in Tennessee has been thus operating for approximately 30 years.

Where the wools have been assembled at strategic points and graded before the eyes of the producers, the grading has had a marked educational value. The growers saw at once the cause and the cost of low grades, particularly in the case of cotted, burry and seedy, and short-fibered, run-out fleeces. Efforts on the part of various agencies working for the betterment of the flocks were given point by this optical demonstration on a dollars and cents basis, and the better growers received the full value of their wools.

A continuation of the cooperative marketing of the clip in the fleece-wool States promises good results for the future in the field of associative effort by the producers. The assembling of the wool at strategic railroad points in not less than car lots, and the grading of it at such points, when practicable, by reliable graders sent out for that purpose, would greatly stimulate betterment in breeding and care in selection. Owing to the greater competition for large lots, the returns for the wool would average considerably more over a series of years, whether the clips were sold by auction or by private sale at such points, or were consigned to reliable firms at market centers. If sold at assembly points and invoiced at the local weights, differences of opinion occasioned by the shrinkage of "green" wools while in storage at central markets would be eliminated. In this connection, however, it must be borne in mind that pooled wools must be handled by highly trained wool men, both in the grading and selling. There are approximately 500 wool firms of major importance in this country. The average, including members of the firm, is about four salesmen to the firm, all watchful for business. Unless wool-pool officials employ graders and salesmen of like caliber, or make use

of established firms, whether commission or other, in disposing of their wools, they can not expect to operate on the most efficient basis.

SPECULATIVE CHARACTER OF THE WOOL TRADE.

The wool trade is an exceedingly speculative business. It could not be otherwise in view of the wide range in quality, length, character, shrinkage, and other factors of condition which are always present. Future trading in a commodity with so many variable factors is impossible. Dealing in wool lacks the stabilizing influence exerted by trading in futures. Wool dealers therefore have had to "hedge" their operations by speculative purchases and to depend on an excess of profit over loss for a series of years. Should the growers dispose of the clip through commission firms only, they would themselves assume the risks of the business. Whoever carries the wool until called for by the mills must assume the cost of transportation, grading, handling, storage, and other items, and the risk due to market fluctuations.

The Wool Dealers' Place in the Trade.

As the trade is now organized, the wool dealers assume the expense and risk during the active marketing season, and dispose of the wools as needed by the mills. This has been a service which the growers hitherto have been unwilling or unable to render, but it is essential in the marketing of wool. The mills usually have not the capital or the credit to buy a year's supply at a time. A manufacturer with strong financial backing may buy a large part of his supply at range points if he is sure that he will profit more thereby than if he bought as needed on 60 days' dating or more, but few mills care thus to deal in wool. They usually buy only such grades as are adapted to manufacture into fabrics for which they have or expect to get orders, and they go to the dealers for the wools as required.

One reason why many mills do not care to purchase far ahead is that often they are not sure just what grades they will need. If mills bought heavily at range points, they would have to resell a portion of the purchases as "off-sorts"—i. e., qualities not adapted to the particular mill needs. Such wools would have to be sold on time, just as any dealer sells, and would represent so much inert capital. Large corporations with many factories turning out a wide range of fabrics would seem to be an exception, but such concerns normally do not deal in wool extensively. Many mills buy only graded wools, and insist on very close lines, which they often pay premiums to get. They prefer to deal with certain firms, which know their desires, grade the wools accordingly, and with whom necessary adjustments and allowances can be made with a minimum of friction.

The dealers have financed growers to some extent and mills to a considerable extent. During the late winter months they usually have a considerable surplus of funds or credit which they do not hesitate to extend to reputable sheepmen who are in need of additional funds to carry them through shearing. The dealer frequently advances a part of the value of the clip at a lower rate of interest than local range banks will grant, particularly when such banks are already heavily loaded with securities for loans on sheep and wool. When this is done the sheepman usually has to pay a commission to the dealer if the wool is sold to another firm. In financing the mills the dealers sell on an open account on 60 days' dating, often on much longer time when the market is dull or credit is restricted. One per cent is deducted from the price for cash within 10 days, and 1 per cent has to be paid to a broker if the sale is made through such intermediary. Frequently the mill is further financed by deferment of settlement at the prevailing interest rates, and such a loan may not mature until the finished product into which the wool enters is paid for.

This financing of the mills, and the financial strength of the dealers themselves, by refusing to sell at what is considered an unduly depressed level, enables them to minimize the price declines which may occur. Their power in this respect is weakened by competition among firms, particularly on an exceptionally dull market. It frequently is the case under such circumstances, and occasionally even on a normal market, that the actual cost of wool in the warehouse is not considered in making a sale. The firm figures on breaking even on another sale or in the foreign wool department or in another season.

MARKETING AGENCIES COMPETING WITH THE DEALERS.

Most of the services performed by the wool dealers in the present organization of the trade are now performed by other marketing agencies to the extent that a portion of the domestic clip is sold on consignment. As already suggested, however, the risks entailed in wool dealing are not eliminated. The responsibility is merely shifted. When wool is consigned to a commission firm, the investment burden normally carried by the wool dealer is shouldered by the grower, who also assumes the risk due to market fluctuations in the value of his wool. Through his market representative the sheepman then disposes of the wool as needed by the mills. He also bears the cost of mill financing in so far as the wools are sold subject to deferred payment, because he loses interest on the value of his clip until finally paid for. On the other hand, he receives the benefit of the price spread between range point and market center, less freight and marketing charges, provided that the clip is consigned year after

year. As already indicated, most growers in the past have consigned their wools in years with a declining market, and sold on the range on a rising market. They have thus played steadily into the hands of the dealers. This has been the weakest point in the marketing of the domestic clip.

One commission firm has adopted the practice of financing the growers as distinct from merely an advance of a part of the wool's value after it reaches the central market. The loans made may run throughout the year. A form more frequently used, however, is a "fleece loan" made in the winter when need for additional credit by the producer to carry him through shearing is most pressing. Other credit needed may be supplied by local banks, which take a lien on the sheep as distinct from one on the fleeces. This firm permits the sheepman to sell his wool in whatever manner he pleases, without penalty, but handles it for him on commission if he desires. Virtually the only service performed by the regular dealers which is not performed by this firm and its consignors is in the matter of loans to the mills.

PULLED WOOLS.

The packing interests are an important factor in the wool trade through their handling of the wools pulled from the pelts of slaughtered sheep and lambs. Practically one-seventh of the 300,000,000 pounds of wool comprising the annual domestic production consists of pulled wool. Approximately three-fourths are removed from skins in the Middle West, almost entirely at the large livestock markets, and chiefly by the large packing firms.

A number of smaller concerns operate on the Pacific coast, others in Pittsburgh, Philadelphia, New York, and Boston, and a few small ones are located elsewhere, both east and west. Nine concerns pull three-fourths of these wools. The average weight of pulled wool per pelt, as reported by concerns which pulled two-thirds of the total, was 3.18 pounds in 1918 and 3.14 pounds in 1919. The two largest in the country showed an average per pelt slightly above these weights.

The pelts, after removal from the slain animals at the large packing plants, are cleansed on the flesh side and then thoroughly soaked and washed. If they have been salted and shipped to the pullery the soaking is prolonged in proportion to the degree of dryness which they have attained. After passing through centrifugal driers they are painted with a depilatory compound composed of sulphuric acid, sodium sulphide, and ground oyster shells, which loosens the fleece from the skin. After the painting, the pelts are folded flesh side in and placed in single windrows on the floor, or hung singly on racks prepared for that purpose, to prevent heating and damage

while the compound does its work. They are left in this condition overnight in a room kept as close as possible to 55° F.

On the next day the pelts are sorted by grade of fleece and length of fiber. The wool is then pulled by hand and thrown into convenient receptacles. This task is supervised by expert workmen who check faulty work on the part of the pullers and separate the improper pulling. Usually three or more sorts are made of each fleece. The pulled fiber then passes by sorts through a drier. At the end of this machine an expert sorter removes any remaining pieces which are out of place in that class. From the drier the wool is blown or trucked to appropriate bins. A considerable but varying proportion of the pulled wools are scoured before sale, but those thus handled rarely include combing lengths.

In one of the two largest pulleries, lamb's wool is kept separate from sheep's wool, and approximately 39 sorts are normally made in each of these two classes, though the bulk falls in comparatively few. The total number includes the various "off-sorts" of burry and seedy, various grades of grays and blacks, paint sorts, floor wools, refuse from the skin-washing machines, and A. B. C., and gray shearlings—i. e., very short wools from sheep shorn just before slaughter and usable only in felts. The other large pullery makes a few more grades than those mentioned above. Other pulleries do not handle a sufficient volume to make such numerous distinctions. The greater part of the pulled wool, however, falls into a few main grades and is sold on the market under the general grades of "AA" (or fine), "A" (half-blood), "B" (three-eighths to quarter-blood), and "C" (low quarter-blood and coarser). On the Boston market the grades usually quoted are extra and fine A, A super, B super, C and low super, fine, medium, and low combing, and shearlings. The firms which pull wool either dispose of the product directly or through subsidiary companies, save in the case of small concerns which sell to or through regular wool dealers.

The sorts made at the two largest pulleries are said to be practically standard from year to year as regards quality and condition. Mills can safely contract ahead for desired classes of wool and be confident of securing what is desired. This is in part due to expert supervision of all phases of the pullery operation, and the thorough washing which the wool receives while on the skins. The shrinkage of the unscoured pulled wools is thus reduced to a fairly narrow range of grease content within the sorts made. Variations therein are a matter of easy adjustment as to price.

The lime process for wool pulling, virtually abandoned in the United States in favor of the depilatory method, differs therefrom only in that the skins are painted with slaked lime to prepare for pulling. The "slipe" wools of Australasia are pulled by the lime

process. The sweating process is practically never used in this country save in the case of inferior pelts with a skin of small value. As used in America it resulted in much damage to the skins and caused too high a percentage of rejects or seconds when the skins were tanned. A good sheepskin is worth as much or more than the wool pulled from it. This process is used with excellent success, however, at the world's chief pulling center—Mazamet, France.[13] It is practicable at Mazamet because of the skill and the stability of the local labor supply. The pelts are hung on racks in warm rooms with an artificially humidified atmosphere, and great care is exercised to prevent decomposition of the skins while the heat and moisture loosen the wool. In recent years, however, the depilatory system appears to have been steadily displacing the more primitive sweating process at Mazamet.

Pulled wools are somewhat deficient in spinning properties, and when used in worsted manufacture are usually somewhat more "wasty" than most shorn combing fiber. They are "longer" than the latter, as the full length of the fiber, including the root, is pulled from the skin, while wools of the same growth, if shorn, leave about one-fourth of an inch on the skin. The attachment of the root to the pulled fiber[14] is one factor causing them to take dyes slightly less readily than if shorn, but there is usually no striking difference between the uses to which most pulled and shorn wools are put in manufacturing. The harsh feel which characterizes the pulled fiber is equally characteristic of much of the domestic shorn wools.

CONCLUSION.

There is no open market for wool in the United States. Wool is sold mainly by private treaty, in strong contrast with the open market and auction sales in London and Australasia. Auctions of wools belonging to the United States Government and to Great Britain, and the Philadelphia wool auctions of the past season, merely formed an exception to the rule. In London and Australasia the world is the buyer, and the stability of the auctions (the essence of the open market) is maintained by competition among purchasers from every manufacturing country. All these countries would have to be seriously affected by financial and trade crises before the value of the auctions to the grower would be nullified.

Under the present organization of the wool trade, the marketing of wool in the United States is an activity in which relatively few producers normally have taken part after their clip has left the shearing shed. The product has been gathered principally into the hands of a relatively small number of dealers located in or con-

[13] Hart, Stanley H.: Wool, p. 137.
[14] Ibid., p. 141.

veniently situated with respect to the large manufacturing areas. These dealers grade the fleeces according to diameter of fiber, character, length, shrinkage, and other factors affecting condition, according to the trend of the market and with reference to requirements of the mill clientele served by them. Grading of the wool is a specialized task. Owing to changes in market demand and special mill desires, it is difficult to perform at points of origin. Much of the value of grading at country points lies in the educational value to the grower as indicating the cause and the cost of low grades and poor condition.

The greatest weakness in the marketing of range wools has been the producer's ignorance of wool values and of market conditions. Lack of information or of proper interprepation of trade data has resulted in a severe handicap to the growers. They have, in general, sold their wools in such a manner as to favor the buyers rather than themselves. This method of sale has been due to some extent to financial needs of the sheepmen. Necessity for continuous heavy use of borrowed capital attendant on the transition from free to deeded range, and steadily rising production costs resulting from other factors, have required a large number of the growers to dispose of their wool earlier in the season than they otherwise would do in order to secure needed funds. This has often been true irrespective of knowledge or ignorance of market conditions on the part of individual sheepmen. In order to remove this element of weakness, if indeed it is entirely removable under present conditions of rangeland utilization, a considerable modification is necessary in prevailing methods of financing the sheepmen. Such a change has already been instituted by one of the commission houses operating in the range region. This system of financing permits the grower either to sell at the shearing shed, without penalty, or to consign his wool.

The use of "acceptances," as outlined by the Federal Reserve Board in conference with wool growers and others (June 22, 1920) would seem to favor a change analogous to the above, and would seem also to be a step toward furtherance of consignment business in wool marketing. But it must be borne in mind that acceptances can only be issued against a commodity with a known market value, and no larger advance in the form of a draft should be expected by their use than by the old method of consignment. However, if wool is consigned to a dealer or commission house, there is no maturity connected with the advance made. The maturity is the date of sale, and when the clip moves slowly this form of advance is a great convenience. Should wool prices decline enough to wipe out the advance, or even more, the consignee is generally lenient in granting time for repayment of over-advance. On the other hand, irrespective of the state of the market the obligation to liquidate at

maturity the drafts based on acceptances can not be avoided. This should be given careful consideration. It should usually be practicable to sell the acceptances before maturity, but on a slow market this might entail loss. If their use is found practicable, it seems reasonable that growers who favor consignment other than to favorite firms or selling agencies would prefer to operate through local banks which extend them other credit. A general adoption of acceptances, besides enabling the sheepman to hold his clip for a maximum of six months at the prevailing rate of interest, should also permit the financing to originate in local credit sources. A general adoption and persistence in the use of acceptances might greatly modify the prevailing method of marketing the domestic wool clip.

All persons interested in the wool trade, whether dealer, millman, or commission salesman, agree that the sheepman should either sell at the shearing shed every year, or should consign every year, in order to secure the maximum return for his clip. The prevailing practice of selling at the shed on a rising market, if not on contract months before, and consigning on a weak or falling market, has been a costly method of marketing the wool. The prevalence of this practice is in no small degree due to the carelessness of the wool growers themselves, though it is fostered by the wool trade in its own interest. The typical range clip is of sufficient size to permit either individual sale at the shearing shed or sale on consignment. The former, if persisted in, should secure the grower approximately the full value of his wool at the shed. The latter, if continuously followed, gives the producer the additional return from the spread in price between range point and market center. It also gives the consignor the benefit of the knowledge and experience of the consignee, and should entirely discount the sheepman's ignorance of wool values and market conditions.

In the fleece-wool States, ignorance of wool values and of market practices is further complicated in a large part of the region by the scattered nature of the clip. Competition for the wool is rather limited under such conditions, and it is often first bought by local men who are possessed of little or no more knowledge of wool grades than is possessed by the growers. In areas where more wool is produced this usually is not the case, but the growers have been seriously handicapped by lack of knowledge of wool values. The recent widespread adoption of wool pooling, frequently with grading at loading points, has shown that it is quite feasible for the fleece-wool shepherds so to assemble their wools as to make it practicable for dealers or mill buyers to deal directly with growers' committees, or to consign their wools to firms at central markets. The educational value with reference to wool grades would be considerable under either

plan. Competition for the wools in large lots at assembly points, or sale by consignment, should usually operate to discount lack of knowledge on the part of the growers with respect to wool values and market practices. To secure the maximum return, however, one or the other of the above methods of associative sale should be followed exclusively. Unless the fleece-wool shepherds thus assemble their wools, they can market their clips only as heretofore, i. e., with a minimum of effort, a quick turnover in normal years, and nearly the same price to all. It is not practicable for mills and dealers to send out purchasing agents to gather up thousands of small clips—10 to a few hundred fleeces each—produced in a region extending from the Atlantic Ocean to the one-hundredth meridian and from the Gulf of Mexico to Canada. If it were practicable there probably would be but little change in the outstanding characteristics of former fleece-wool marketing methods so far as concerns returns to the growers.

Trading in wool is an activity the returns from which are gravely affected by the numerous variable factors inherent in the wide range in quality, length, character, and shrinkage of the product handled. These factors render future trading impossible and eliminate its normally stabilizing influence. Shrinkage alone has much to do with the existing speculative character of the wool dealer's activities. Through whatever agency the domestic clip is marketed, the marketing of the fiber will remain a risky distributive function, the uncertainty of which will always be accentuated by competition between domestic and foreign wools.

In the existing organization of the wool trade, the dealers purchase from the grower and sell to the mill on a scoured content basis, though the price paid in each case normally is on weight of wool in the grease. They finance the range growers to some extent, and to a large extent they finance the mills. They buy the domestic clip during a period of approximately three months of active wool movement, and they carry a considerable part of it for a year. In the meantime much of their capital is idle. They assume the cost and risk involved in purchasing the domestic clip during a period of three months and in issuing it to the mills during the entire year. Both cost and risk normally increase in direct ratio as the storage period lengthens. Any agency replacing the wool dealers must render these essential services, assume the inevitable costs and risks, and take the losses as well as the profits entailed by such activity.

Should the wool growers adopt a strictly consignment system for disposing of their wools, either by commercial acceptances or by straight consignment to wool merchants or to commission firms, whether cooperative or not, the growers must assume the risks now carried by the dealers. They must then finance the mills in so far as the wool is sold subject to deferred payment, which is the prevailing

trade practice. They also must assume the cost of carrying the wool until sold to the mills, besides the other marketing charges. Over a series of years such a method of marketing the wools should leave a net surplus arising from the normal spread between price at country points and in market centers.

CHAPTER NOTES.

I.—Intermediate Grading.

The intermediate grades of "French" and "Baby combing" represent a refinement in wool handling which is the result of comparatively recent improvements in wool-combing machinery, improvements which have greatly modified the former length requirements for most combing purposes. They are analogous to limited lines of fine fiber, approximating Delaine length (3 inches), which began to be made in the sixties for a few mills combing such wools, while most mills in the young worsted industry used no fiber shorter than 4 inches. Market quotations for these intermediate grades are usually lacking as they are not always made. When made, but little of such wool really goes through French combs. As now constructed Bradford combs can be set to handle fiber nearly as short as the French.

This intermediate grading really has made little difference to the producer provided he got a satisfactory price for his clip. With reference to prices, there have been sharp differences of opinion. At range points, whether or not the wool has been previously graded, the clips have been bought entire, and at a flat price. Fleece States' clips also have been sold largely at a flat price. There is now a growing appreciation, on the part of many producers, of the value of knowledge concerning grades, but in both cases the main argument at original points heretofore has been based primarily on prices and only incidentally on grades. This dominance of the question of price was due to the fact that, aside from the influence of length of fiber, shrinkage in scouring was the chief factor in determining prices paid for wool in the grease. This was true not only within each grade but from grade to grade. That is, combing wools in the grease (as shorn from the sheep) averaged very close together in price irrespective of grade. The same was true of clothing lengths.

Fine wools were worth much more in the scoured condition than coarser wools, but their higher average shrinkage was such that their value in the grease was no higher, usually was slightly lower, than wools which graded half-blood to quarter-blood. The difference in grease price was so small[1] that in any given lot an unusual variation in shrinkage from the normal for that grade could raise or lower the grease wool value, for that lot, to a point quite out of line with the price usually quoted for that grade. This was particularly true of range-grown clips, the shrinkage of which is much more variable than with fleece wools.

Under the abnormal market conditions of 1919, shrinkage remained dominant in price determination within grades. From grade to grade, however, shrinkage was more largely subordinated to fineness of fiber than at any time within

[1] Boston prices for October to December, 1909–1915, inclusive, for Ohio, Pennsylvania, and West Virginia wools, averaged approximately 27¼ cents per pound for fine Delaine and 29½ cents for half-blood to quarter-blood. Territory wools averaged approximately 64½ cents for fine staple (clean scoured), 59½ cents for medium staple, 58¾ cents for fine clothing, and 54½ cents for medium clothing. In the grease these prices meant about 22 cents for fine staple as against 23¾ cents for medium staple, and 19¾ cents for fine clothing as against 20 cents for medium clothing. From Boston market statement in Bulletin of Nat'l. Ass'n. Wool Mfrs., vols. 40–46.

the last half century. This was particularly true when half-blood and finer wools were compared with grades below half-blood. This reversal of prewar form will continue as long as prewar price ratios, as between grades, remain upset. In case the prewar ratios do not return, and many members of the trade expect such to be the case for a considerable period, the question of grades will be about as important as that of prices, because of the greater bearing of grades thereon. Shrinkage, of course, would remain as a very important factor in the price paid for wool in the grease, particularly within grades. Should recent developments in consignment business become permanent, however, the grading now done by dealers would be done by consignees, better informed on all these points, and the different grades would sell as such, and at the prices prevailing for such grades, when sold to the mills.

In actual market practice there is considerably less grading along strict length divisions than might be supposed. Clips from given areas, although considerably affected by seasonal climatic variations, tend to "break" along fairly definite lines as to length. For instance, in a typical fine or fine medium Utah clip there is usually too little wool of staple length to make it worth while to grade out, and there is enough short fiber to need the longer wools to carry it. Such clips are usually sold in the original bags to mills which prefer to do their own grading. If such clips are graded before sale, that in the staple pile may contain considerable fiber as short as 2¼ inches, while the clothing includes all other. In a well-grown clip there may be very little wool not of French combing length (about 1½ to 2 inches), and a pile of "fine clothing" is nearly as well adapted for the making of a "short" top as it is for carding purposes. In areas where the clips normally "break" longer—as western Idaho and eastern Oregon—if the wool is not sold in the original bags, there may be a "selected" staple grade made. No fiber shorter than 2¾ inches is included therein. The usual grade made, however, is a straight staple, composed of wools approximately 2¼ inches and longer. The "selected" staple class is made for only a relatively small proportion or the top-makers and mills, as most of them do not now require it. At the same time, relatively little fine staple of this length is now produced on the range.

The closeness of grading for such length increases when demand for the finer worsted is keen, and mills desiring it are willing to pay a premium of several cents per pound (in the grease) above straight staple prices. When the selected staple class is made, shorter combing fiber, longer than French combing, may be thrown into a pile of staple which contains too little wool of superior length to be profitable to grade out, or it may be classed separately as "fine" or "fine medium" Territory. In the latter case it commands a considerably lower price than selected staple or staple and is not specifically designated as either combing or clothing.

The wool below staple length may be thrown into French combing and clothing grades if enough French combing is present to make it profitable to grade so closely. In the latter case the fleeces of stubby length are thrown into a strictly clothing pile for sale to a manufacturer of woolens. In an off year, with the wool not of very good growth, all the wools below staple may be thrown into a clothing pile by a dealer who otherwise would grade more closely. Many dealers throw their wools only into staple and clothing classes but the "clothing end" of clips better grown than others are usually kept separate, as most of it will be of French combing length, and can be sold to top-makers. A typical pile of fine clothing wool is usually fairly well adapted to combing on the French system, but a pile graded distinctly for French combing is worth considerably more per pound.

In this connection it should be noted that on the 15th of May, 1920, the Commercial Bulletin (Boston) quoted fine staple at $2.05 to $2.15 per pound clean scoured; fine clothing at $1.75 to $1.85. At that time representative dealers valued a superior lot of fine French combing at $1.90 to $2 clean scoured as against $2.10 to $2.20 for a similar class of fine staple. Half-blood staple was put at $1.80 to $1.85, and half-blood French combing lengths at about $1.60 to $1.75. Three-eighths-blood baby combing was then worth 2 to 3 cents less per pound in the grease than strictly combing, and as much more than strictly clothing lengths in that grade. On a clean scoured basis these price differences would be about doubled.

A quotation of the middle of September,[2] after price recessions had progressed considerably, notes fine Montana staple (original bags) at $1.40 to $1.50 clean basis, and Territory French combing of good character at $1.25 to $1.30. At the same time, fine Cape combing was noted at $1.40 to $1.45 clean landed, Boston, and fair French combing lengths at $1.15 to $1.20. Three weeks later[3] fair Cape combing was valued at $1 to $1.10 clean landed, French combing at 80 cents, and clothing lengths at 70 cents. At the resumption of auctions at Sydney, Australia, in October, fair to good 64s combing sold at about $1 clean landed basis and French combing 64s at about 90 cents.[4]

II.—Origin of Blood Terms Used in Wool Grading.

The terms "half-blood," "quarter-blood," etc., as now applied to domestic wool grades, originated over a century ago. They came into use when the rather nondescript, coarse-wooled, common sheep of the East were being graded up with Spanish Merino bucks subsequent to the embargo of December, 1807. According to the amount of Merino blood present in the sheep, the wool was sold as quarter-blood, half-blood, three-quarter-blood, and full-blood. Wool from Saxon Merinos and Saxon-Spanish crosses was classed separately from full-blood Spanish after the Saxon sheep reached the United States a number of years later—during the twenties. For many years these blood terms remained fairly indicative of the breeding of the sheep which produced the wool. Subsequent to the late thirties, however, a steady demand developed for a heavier fleeced, coarser wooled Spanish or American Merino type of sheep. The fineness of a large part of the purebred or nearly purebred part of the domestic clip was slowly lowered until during the sixties the old three-quarter-blood grade became generally known as "X." By that time that type of wool was shorn from purebreds, or from sheep with a negligible, often imperceptible, infusion of common blood. Although still used occasionally, the old term has virtually become obsolete and "fine" or "X" is applied to wool shorn from purebred or practically purebred Merinos, but below "XX" grade (the old full-blood wool type).

By 1860 the other blood terms also were coming to denote types of wool rather than the blood lines of the sheep which grew it. This was in part due to local adoptions of crossbreeding for the development of mutton types of sheep in the East and the Middle West. Crossbreeding became quite widespread soon after the Civil War, both in the East and the Middle West. After some use of long-wools, the Down breeds figured mainly in the crossing done. The Downs (other than the Southdown, which was relatively little used, but purebreds of which

[2] Boston Evening Transcript, Sept. 9, 1920, p. 6, col. 5.
[3] Journal of Commerce and Commercial Bulletin (New York), Oct. 5, 1920, p. 2.
[4] Special wire to Bureau of Markets, U. S. Dept. of Agriculture, Oct. 7, 1920.

often grew wool of half-blood quality) produced wool from quarter-blood about midway to the half-blood type, i. e., a three-eighths-blood type. First-cross Down-Merinos generally grew fiber of a low half-blood to three-eighths-blood in quality.

Three-eighths-blood, although a well-defined wool type during the sixties, did not appear in market quotations until the worsted industry became important some time thereafter. Until nearly as late as the nineties there was no market quotation between half-blood and quarter-blood, and the range they covered was often combined into a "medium" grade as distinct from common to braid. The latter were designated as "common" or "coarse." Sometimes numbers were used, as No. 1 (half-blood and three-eighths-blood) and No. 2 (quarter-blood). The numbers 1 to 3 are now sometimes used to designate a range from half-blood to quarter-blood types of wool.

During this period of crossbreeding a "XXX," or superfine grade, which probably corresponded to the former Saxon-Spanish grade, also the "Picklock" or straight Saxon or Silesian type, a grade above XXX, steadily declined in amount. A still higher grade, "Pickneck"—of super-Saxon fineness—was rarely found after the early seventies. Picklock practically disappeared during the nineties. "XXX" is now produced only in small amount, and is separated from "XX" for only a few mills, which pay a small premium to get it.

It is probable that the old blood terms were fairly applicable to range wools, while the coarse-wooled Mexican foundation stock was being graded up with Merinos prior to the eighties, but it was not so designated in market quotations. When crossbreeding developed on the range later on, the sheepmen soon turned to longwools—chiefly Cotswolds and Lincolns—so far as stock or breeding sheep were concerned. This resulted in clips to which the old blood terms were even less applicable than previously in the East and Middle West. For well over half a century, therefore, the terms used in wool grading to denote fineness of fiber have had little or no relation to the breeding of the animals which grew the wool. The old blood terms now represent only heritage from early developments in American sheep breeding.

III.—Characteristics of Southwestern Wools.

The Texas and California clips have a characteristic elasticity, strength, fineness, and felting quality which distinguish them from those of the northern ranges. Of these the Texas wools, in the main are somewhat more desirable. These qualities are due to the almost universal retention of finewool blood in the sheep kept, as against the widespread crossbreeding adopted in most areas to the northward. In southwest Texas and southern and central California (sometimes in northern California) double shearing—spring and fall—is quite common. Locally it is almost the rule.

A part of the "spring" or "eight months" clip is usually long enough for French combing, but the great bulk of these "short" wools is of clothing length and is used in fine woolens. A varying percentage of the "fall" or "six months" clip (sometimes a part of the spring) is as short as half an inch and is used in fine felts. Double shearing was formerly more general on the southwestern ranges and is continued in these areas because of climatic factors and the character of the range. The "twelve months" wools are of French combing to staple length, and with the exception of extreme west Texas and a few areas in California, relatively few of them are usually shorter than 2 inches. Normally there is a large proportion of staple length, and a great many individual clips run largely to staple length. The better of these twelve months wools are fairly comparable to Ohio Delaine in quality, length, and condition.

During seasons of more than normal rainfall the Texas wools often carry considerable "needle grass," which constitutes a "defect," while a considerable proportion of the California clip, particularly in the south, is marred by mestiza bur. This bur is also being introduced into Texas by rams brought from California. In both cases these defective wools must be carbonized to be freed from this foreign matter.

There are wide seasonal as well as local variations in condition (shrinkage in scouring) in both these States. The state average for California has been approximately 64 per cent for the past six years, but wools grown in northern California usually shrink somewhat less than those grown in the southern counties, and also contain less foreign matter other than sand and silt. In general the middle county clip falls between the two. As a general rule, short wools of similar breeding and character shrink 1 to 3 per cent more than longer fiber, but because of variable care and range conditions there often is no more difference between six or eight months wool as against twelve months than there is between clips of similar growth in the different areas. Sectional variations in the Texas clip show as wide a range in shrinkage as in California. The state average has been about 65 per cent for the past six years, but individual clips shrink as low as 58. In the San Angelo area and from Del Rio to as far west as Sanderson, the clips generally shrink from 62 to 67 per cent. To the north and west of San Angelo the shrinkage is much higher. In dry years it ranges from 65 to 80 per cent, and in unusual cases as high as 85 per cent in extreme west Texas. In the Kerrville area, which comprises about nine counties, the clip normally shrinks from 60 to 65 per cent, and its condition is more uniform than elsewhere. The best line of Texas wools, especially twelve months fiber, is sold in Kerrville, where about 65 per cent of the annual sales are "long" and 35 per cent "short" (spring and fall). At Sanderson approximately 90 per cent of the annual sales are short wools.

As an indication of the difference in value of the wools discussed above, on the Boston market in the middle of last May, Texas twelve months, clean basis, fine and free, was quoted at $1.90 to $1.95 per pound, eight months at $1.60 to $1.70, and six months at $1.50 to $1.55. The same quotations applied to fine, free Californias of similar growth and condition. In addition to the lower price, the sheepmen who shear in both spring and fall have a double shearing expense to meet. Fine, free California northern, twelve months, was quoted at $1.90 to $1.95, middle county at $1.70 to $1.75, and southern county at $1.50 to $1.60. The costliness of a defect in the clip is indicated by the quotation of $1.45 to $1.50 for California fall free, and $1.30 to $1.35 for fall defective. A quotation of April first[5] puts Texas and California twelve months, fine and free, at $1.85 to $1.90, and carbonized at $1.55 to $1.75.

Arizona wools in general have the same characteristics as those discussed in the foregoing pages and for the same reason—a vast predominance of finewool blood. Double shearing is not practiced, but the character of the range is such that the bulk of the clip usually does not exceed French combing length. It averages, therefore, somewhat shorter than a large part of the Texas and California twelve months wool. However, the greater part of it is combed. Apart from this slight deficiency in length the Arizona clip is equally as good as that of Texas or California. Locally it is better than most of that of these two States and fully equal to their best. At the same time very little wool grown in Arizona requires carbonizing, and one cause of diminished returns to the sheep-

[5] Commercial Bulletin (Boston), May 15, 1920. American Wool & Cotton Reporter, Apr. 1, 1920.

man is absent. The variation in shrinkage, and effect on returns to the growers, is as wide as in Texas. During the past six years the average shrinkage has been approximately 64 per cent. In one area it usually ranges from 67 to 75 per cent, but in most sections it is much lower and is said to average usually no higher than 62 per cent. Aside from Indian flocks the wools run quite uniform in quality, and it has been estimated that 90 per cent grades as fine and fine medium. Quite apart from its good quality, about one-third of the clip is shorn between February first and April first to fifteenth, and usually is on the market months before other range clips arrive. It is especially in demand for that reason, particularly with the keen demand of recent years.

A large proportion of the New Mexico clip lacks the strength, evenness, and quality of the other southwestern wools. This is in part due to less care in selection and breeding, and in part to the excessively dusty (often quite alkaline) ranges with their very sparse vegetation. In an unusually dry season the high shrinkage is accentuated, with logical effect on the return to the grower. The country east of the Manzano Range and the Sacramento Mountains usually furnishes grazing superior to that of most other sections outside of the National Forests. The greater part of the best wool is grown in the southern half of this area—the central and lower Pecos Valley and eastward to the Texas line. Roswell is the approximate center, and also is the chief wool concentration and sale point. For many years, because of the better character of their clips, American shepherds in New Mexico have secured several cents per pound more than Mexican sheepmen for their wool in the grease. This still is the rule, although considerable improvement has been made in the character of the clip in the State as a whole. In the Pecos country, where Americans own the bulk of the sheep, careful selection and breeding of such types as Delaine and Rambouillet have been practiced for many years. They have largely bred out the old Mexican blood. In normal seasons their clip runs largely to French combing or longer. It also is more uniform in grade and character than in most other areas in the State. In the western part of this section the shrinkage usually ranges from 62 to 66 per cent, eastward it generally runs from 66 to 72 per cent, while in most other areas the same per cent (sometimes a higher) shrinkage is the rule. The state average has been about 67 per cent during the past six years.

In the eastern part of the Pecos country the wool is similar to that of extreme western Texas. A large area common to the two States produces a heavy, shrinking fiber of homogeneous finewool type, fairly well grown, but with comparatively little of staple length in most years. In the more favorably located parts of the Pecos region the sheepmen produce wools surpassed by but few of the Texas growers. It is said that if they could operate on the paddock (fenced pasture) system in common use in southwest Texas, their wool would be surpassed by none of the Texas clip.

In all four of these States, save for the Navajo and similar relatively unimproved wools of Arizona and New Mexico, a very large majority of the wools grade half-blood and higher. To a considerable extent they are sold in the original bags (ungraded) by dealers or commission houses which buy from or handle them for the growers. Farm-grown wools of Down or crossbred type are a minor or negligible factor in the production, save in a few areas in California and in northern and east central Texas. A few early lambs are produced on irrigated farms in southeast New Mexico, but mainly from range ewes, and the wool shorn is chiefly fine. Many early lambs are produced in Arizona on irrigated land, mainly in the Salt River Valley, but they are out of cull range ewes almost entirely.

IV.—Characteristics of Northern Range Wools.

Oregon Wools.

Oregon is the only State north of the southwest whose clip is usually classed separately from the balance of the Territory wools. The Oregon clip is divided into "Valley" and "Eastern." The Valley wools (western Oregon) are chiefly farm grown and are similar to the fleece wools in character and condition. Longwool blood predominates in the sheep kept, as the climate is deemed too damp for finewools. At points of origin these Valley clips are known as fine, No. 1 (half-blood), No. 2 (three-eighths-blood), No. 3 (quarter-blood), and No. 4 (common and braid). The fine may be designated as No. 1, in which case common and braid go as No. 5. These grades are only approximated at local assembly and sale points, and they all have to be regraded by the buyers. Grades 2 to 4 largely predominate, i. e., three-eighths-blood and lower. They are all bright wools, of combing length, normally shrink less than range clips of similar grade (averaging about 50 per cent), and range-grown wools of similar grade and appearance are often interlotted with them because of the lighter shrinkage which characterizes the Valley clip. The Valley wools, however, are "green," i. e., carry excessive moisture when shorn, and lose 2 or more per cent of the original weight when shipped East and stored in cool warehouses. In rare cases this loss is as high as 5 per cent when the fleeces are removed from the bags and graded into piles in the eastern warehouse.

Wools grown in central and eastern Oregon—east of the Cascade Mountains—formerly were almost exclusively of half-blood and finer grades, but in the past 10 years in the more favorably situated sections there has been a steady change to the production of market lambs from crossbred ewe bands. However, as many men in these sections have adopted market lamb production by mating their Merino ewes to mutton bucks, usually Hampshires, and selling all the crossbred lambs, the quality of the wool clip has not been affected to the same extent as elsewhere. Moreover, in the last few years, there has been a strong trend back toward the finewools in much of the above area. Although the quality of the clip locally is quite variable, many outfits shearing little wool of lower grade than half-blood and others little finer than half-blood, the wools shorn east of the Cascades still run largely to half-blood and higher grades. In southern Oregon there has been little change from the old finewool standards because of the dry range and distance from railways.

In normal years the Oregon clip is almost entirely of combing length. The shrinkage is as variable as elsewhere, locally and from year to year. For the State as a whole, it has averaged 66 per cent from 1914 to 1919. West of the Cascades it averages about 50 per cent. To the eastward it is estimated to range usually from 65 per cent to 75 per cent, the latter being somewhat exceptional in most areas. The clip therefore is somewhat "heavy." It is very desirable wool and much of it is sold to the mills in the original bags. It scours a good white and enters mainly into the manufacture of fine worsteds.

Territory Wools.

The other range wools are classed as "Territories," and states of origin are not usually designated. Thirty years ago, a large portion of the Territory wools ran fairly uniform in quality. Save in parts of the Southwest, and a few other restricted areas, the old Mexican foundation blood had been practically bred out, and the range bands as a whole were composed mainly of good type Merino sheep. To a considerable extent variations from section to section were confined to condition, character, and length, depending on differences in quality of the range and the forage available, and on the care used

[illegible]

[illegible] as a result [illegible] winter range. The [illegible] character, and gen- [illegible] South of Utah Lake [illegible] are found only in [illegible] of Sanpete Counties, where

good summer range is available. The great bulk of the range is too dry to turn off a fat lamb and no crossbreeding is attempted. The wool is similar to Nevada in grade—chiefly fine to half-blood—but has a slightly lower shrinkage, i. e., usually about 60 to 70 per cent, and averages about 67 per cent for a series of years. It also is slightly longer in most years, though mainly of French combing length, and it enters into the same manufacturing processes. The Utah clip as a whole has shown a shrinkage of approximately 63 per cent from 1914 to 1919, inclusive.

Colorado wools are variable in grade, shrinkage, and character, because of lack of care and selection in breeding. A large proportion of the sheep are crossbreds of somewhat indifferent quality, though many excellent flocks are found in western, central, and northern localities. Some improvement has occurred throughout the State in recent years. In the eastern half of the State the wool grades mainly half-blood and higher and has a moderately heavy shrinkage, but homesteading has made the sheep business somewhat uncertain and less attention has been given to type improvement. In the western half of the State there is a wider range in grades, though the crossbred ewe bands are found mainly in the central and northern counties. The greater part of the Colorado clip is of combing length and shrinks from 60 to 70 per cent and has averaged 62 per cent during the past six years. It is the least desirable of the range wools, but the term "breedless" sometimes applied to it in years past is no longer generally applicable.

Idaho wools are mixed in grade. Not over 50 per cent are half-blood and finer and these are chiefly grown in the western counties, particularly in Owyhee, and in the Panhandle district. Elsewhere crossbreeding is the rule, and the range bands are composed largely of animals which grow wool of half-blood and lower quality, with three-eighths to quarter-blood predominating.

West central, central, and eastern Idaho have an abundance of summer range admirably adapted to fat lamb production and fairly close to railways. Alfalfa hay is grown in sufficient quantities to permit winter feeding for early lambing from crossbred ewes on a very large scale. Western county wools average somewhat longer than those in central Idaho, but the southeastern counties produce the longest staple. These are of the Soda Springs or Triangle type, which are produced in the area extending from about Pocatello in Idaho down to Ogden, Utah, and eastward to Granger, Wyoming. They are long, sound, with a fairly light shrinkage (around 53 to 60 per cent) and grade chiefly quarter-blood to three-eighths-blood. They are among the best of the Territory wools, and are shipped mainly from Soda Springs and the points just named. Elsewhere the Idaho wools shrink from 60 to 70 per cent, depending on local range conditions and seasonal variations. The clip as a whole has shown a shrinkage of 62 per cent during the past six years. The clip is almost entirely of combing length, and ranks with Wyoming and Montana in the estimation of the trade. In normal years most of the Triangle wools are second to none, though in some areas, because of long continued use of longwool rams, the wool runs low and "brashy"[6] on the skirts.

Montana wools rank with Idaho and Wyoming in the estimation of the trade, and are preferred by many mills. They have a somewhat lighter shrinkage, mainly because of the better grassed ranges, but in common with all Territory wools they now are somewhat uneven in grade. This, however, is less pronounced than in northern Utah and in Idaho and Wyoming. The clip runs

[6] Brittle and wasty. This is especially true where the sheep are wintered on rather dusty, alkaline ranges such as those near the eastern and southwestern parts of the Triangle section.

very largely to three-eighths-blood and higher grades, but wools below half-blood seem to be more common in the upper part of the Yellowstone Valley. The wool is not so strong as that of Wyoming, but is equal, if not superior, to that of Idaho both in character and strength. It scours to a creamy white, which makes it unfit for use in pure white goods, but its softness and other characteristics offset this disadvantage. The clip as a whole has a fairly light shrinkage (averaging approximately 63 per cent from 1914 to 1919, inclusive), good length, and felting properties, and is almost entirely used for combing.

Wyoming carries both finewool and crossbred sheep in all sections, the latter predominating in areas where good mountain range is available in summer. If it were not for the closeness to market for both fat and feeder lambs, the State would probably run chiefly finewools, except in the southwest corner, where wool of the Soda Springs type predominates. North of Fremont and west of Johnson Counties the sheep are shorn late, the range is quite dusty, and the shrinkage runs up to slightly above 70 per cent. The wool grades mainly half-blood and higher. In central and southern Wyoming the shrinkage is less, chiefly on account of earlier shearing, which somewhat offsets the rather dusty winter range. The state-wide clip has averaged 66 per cent during the past 6 years. The lightest wools are shorn in Uinta and Lincoln Counties, in the southwest corner, where the clip grades chiefly below half-blood and shrinks 55 to 65 per cent. To the east and northeast of this area it grades mainly from three-eighths to half-blood, but with considerable fine and quarter-blood. Wyoming wools as a whole are rather harsh, as a result of alkaline ranges, but are the strongest of the Territory wools. They are mainly half-blood to quarter-blood, scour a good white, and are almost entirely of combing length.

CHAPTER 12.

THE MARKETING OF SHEEP AND LAMBS.

DEVELOPMENT OF THE MARKET FOR MUTTON AND LAMB.

The market for mutton and lamb has expanded slowly for the past 150 years as population increased. The large cities of the East have always been the chief consuming centers, and their rapid growth has occasioned the major part of the increase in demand.

A century and more ago New York, Philadelphia, and Boston furnished the chief outlet for the flock surplus in the East. As sheep husbandry moved westward after 1840, sheep were driven or shipped eastward in considerable numbers to supplement local supplies for these cities and contiguous industrial areas. There was a somewhat limited demand for the lamb and mutton until after the Civil War. Then the demand steadily turned to lamb, and was met by an equally steady change from wether to lamb production by flockmasters both in the East and the West. An earlier concentration of effort toward the production of wool, which has been changed largely to a combination of wool and mutton, was further modified to lamb production, with mutton largely incidental and wool secondary to lamb and mutton in total flock receipts.

After 1870, there was a rapid movement of the sheep industry to the far West. Because of free grass and water, low operating costs, and distance to market, the range production for some time was directed primarily toward wool. With the exception of local mining camps, there was no demand for mutton. Sheep were of small value (not over $2 per head in 1885) and were usually allowed to die of old age unless sooner destroyed by winter storms or other causes. Rapid growth of consuming markets, however, later on furnished some outlet for surplus range sheep, which were driven or shipped to Missouri River points, fattened, and then sent on for slaughter. Subsequent growth of demand for lamb paralleled rising range costs. A turn to lamb instead of mutton production occurred on the ranges in order to secure larger returns than was possible from wool production and from occasional sales of surplus animals for fattening in the Middle West.

The first shipment of range lambs is said to have been from Spencer, Idaho, to Omaha, Nebr., in 1888. This consisted of five

carloads. Omaha could use only two cars, and the other three were forwarded to Chicago, where they glutted the market and sold for only $1.50 per head. Growers in the Middle West and in the East were producing nearly as many lambs as the markets could use at that time. Displacement of wethers by lambs on the range was localized for some years thereafter. It was not until 1899 that western lambs were arriving in sufficient numbers to warrant continuous price quotations in the market journals. The change from wethers (for wool) to lamb production on the range was steadily accelerated after 1900, particularly after 1910. With this change to lamb production wool sales became less of a factor in range flock receipts.

Relative Importance of Wool and Mutton Sales.

The welfare of sheep husbandry now depends as much or more on the production of sheep and lambs as of wool. In 1909 sales of sheep and lambs furnished 56.4 per cent of the total flock receipts for the country as a whole. East of the Rocky Mountain States they furnished 62 per cent; in the Rocky Mountain and Coast States, 49 per cent. These details are shown by regions in Table XXXIV.

TABLE XXXIV.—*Percentage of total flock receipts derived from sales of wool and mutton, 1909.*[a]

Region.	1909	
	Wool.	Mutton.
	Per cent.	*Per cent.*
The East (Maine to the Potomac River)	[b] 39	61
The early lamb section (the Virginias, Kentucky, and Tennessee)	24	76
The South (including Arkansas)	[c] 49	51
The Middle West	[d] 33	67
Ohio	53	47
The far West and Pacific coast	51	49
The United States	43.5	56.4

[a] U. S. Census, 1910, Vol. V, pp. 494, 519.
[b] Percentage raised by wool clips of southwestern Pennsylvania.
[c] Percentage lowered by sales of sheep in abandonment of sheep husbandry.
[d] Percentage lowered by sales of fed lambs before shearing.

Until wool prices became unduly enhanced by war-time needs, the shepherds in the fleece States appear to have derived approximately one-third of their total flock receipts from sales of wool and two-thirds from sales of sheep and lambs. This was true outside of the fine wool region of the Upper Ohio Valley. In this region—eastern Ohio, southwestern Pennsylvania, and the Panhandle of West Virginia—approximately 60 per cent was derived from wool sales. With the rise in wool prices, particularly for the 1917 to 1919 clips, the percentage derived from wool sales appears to have

risen to about 38 and 70 in these two cases, respectively. On the range the percentage derived from wool was lowered until 1915 by the extension of crossbreeding for market lambs, but subsequently was raised considerably by the rise in wool prices. This was especially true in the ranch and range sections of Texas and New Mexico, where the character of the range compels the sheepmen to rely mainly on finewool sheep kept chiefly for the wool clip. In such areas, wool sales are as important as in the Ohio region, or more so, and animals sold are mainly yearlings and mature sheep.

METHODS OF DISPOSAL.

Sheep and lambs are marketed in three ways, (1) through the central markets, (2) by means of local butchers, and (3) by farm preparation of meats. The number shipped to the central markets varies from 35 per cent in some regions to 90 per cent in others. The others are usually sold to local butchers, slaughtered on farms, or disposed of for breeding purposes. In 1909, 17 per cent of the sheep and lambs slaughtered were killed on farms or in local butchering establishments (13.2 per cent in retail slaughterhouses and 3.6 per cent on farms).[1] Many of those killed on farms were hothouse lambs, killed prior to shipment to special customers or to wholesale commission merchants in the large cities.

Local Butchering and Farm Slaughter.

Farm slaughter and disposal in the carcass or sale to butchers for retail or local trade are especially important in areas where sheep are not kept in very large numbers or where there is a large local industrial population or a large tourist and summer resident demand. Such animals do not reach the central markets. These two methods are the chief outlet in most parts of the South, where probably 60 per cent are so sold. They are of relatively small importance in the early lamb section (the Virginias, Kentucky, and Tennessee), where only about 15 per cent are thus disposed of. North of the Potomac River and east of Ohio probably 40 per cent of the sales are made in this way.[2] This applies mainly to those animals disposed of prior to September 1. In parts of Michigan and Wisconsin, where the summer population is considerably augmented, such sales are an important method of disposal; but elsewhere north of the Ohio River and west of the Allegheny Mountains, they rarely constitute more than a minor outlet.

Disposal Through the Live-Stock Markets.

In contrast to the range States and parts of the Middle West, from the South and the East comparatively few shipments to central

[1] U. S. Census of Manufactures, 1910, Slaughtering and Meat-Packing Industry, p. 14.
[2] See Report 118, Office of the Secretary, U. S. Department of Agriculture, 1916, p. 11.

markets are made in car lots by the farmers themselves. The animals are usually sold to local buyers,[8] who forward them to market. Local buyers also operate extensively in the Middle and far West, but car-lot shipments by original owners are much more numerous, particularly in the range States, and in areas to the east of the range country, where extensive sheep and lamb fattening is done. In recent years, shipments by cooperative marketing associations have largely supplemented individual shipment by owners in many parts of the Middle West, and locally in a few range areas, as also at some points in the Coast States. In the Middle West, as a whole, probably 50 per cent of the shipments are made by individual farmers or by cooperative associations, the latter generally being numerically much less important. Where sheep are not numerous, there are many local buyers, except when they have been displaced by cooperative associations. Sales to local packers or to packer buyers are usually negligible factors in the Middle West.

Sale to packer buyers or to local packers is an important outlet in certain of the range States and in the Coast States, but, in general, shipments by individual sheepmen or by local or regional buyers other than packer agents probably account for 90 per cent of the annual total sold for slaughter.

The proportion shipped by buyers varies widely from year to year, according to the extent to which speculative purchases are made by local and regional buyers of sheep and lambs. Sometimes these men contract for virtually the entire crop in many of the States and in other years they buy very few.

Local Buyers versus Cooperative Shipping Associations.

Both east and west of the Alleghenies, the operations of local buyers have caused much criticism by producers. In certain respects this criticism has not been fully warranted. The buyers' overhead expenses have been high because of the frequent necessity of procuring the animals in relatively small numbers throughout a fairly extensive area before a carload is assembled. It is often necessary to ship the sheep and lambs with other live stock in mixed car lots. Furthermore the risk due to market changes is great. A very large percentage of sheep and lambs from the fleece States is only of medium to cull quality. They are marketed during the fall months, when the arrivals at the markets are most numerous and when large receipts of mediocre to cull animals are frequent. Declines in the price received for such stock, and for sheep in general, frequently are large and sudden. In addition, most buyers have had to buy for cash at a nearly uniform price, irrespective of quality, because few

[8] Sale to local packing establishments as distinct from local butchers for retail trade furnishes an appreciable outlet locally in the East and the Middle West and an important local outlet in some of the far West and Coast States.

growers have appreciated the real effect on market prices of differences in quality, and they often refuse to sell at a lower price than a neighbor has received. As a result, mediocre lambs have often been sold by the farmers for more than their real value, while superior animals have usually brought considerably less. But at the same time most buyers have made no effort to diffuse market information as to grades and the effect on prices. In any case, however, a wide margin between price at country point and market center has been necessary to cover the risk and the high overhead expense. As a rule, unexpected market declines have caused local buyers operating on close margins to remain in the business but a few years.

Cooperative shipping associations, when properly managed, have practically always resulted in larger returns to the members, and they are the only means whereby the very necessary but often relatively costly services of local buyers can be dispensed with. In other words, until the producers displace the local buyers by cooperative action, the local buyers have been a necessary evil. Except when unusual market fluctuations have occurred, the cooperative associations, by distributing the risk previously carried by the buyers and by eliminating a large part of the overhead expense, have usually been able to narrow the margin between shipping point and market center to a sum little above the actual cost of shipment. In addition, returns to members have been made on the basis of quality as well as of number, greatly to the benefit of the more careful shepherds. This applies also to parts of the far West where farmers, as distinct from ranchers, have combined for cooperative shipment. Cooperation has been used with striking success by growers in the Imperial Valley of California. In very recent years the number of cooperative live-stock shipping associations has been increasing so fast that the Bureau of Markets, U. S. Department of Agriculture, has experienced difficulty in keeping in touch with them. The producers evidently are becoming cognizant of a weak point in their marketing. They are replacing sales based on a quick turnover and a minimum of effort on their own part by a system of selling which involves a small amount of effort and a very slight delay in cash receipts, but which practically always enhances the receipts quite out of proportion to the small labor and delay involved.

In the range States in general, however, local and regional buyers function on a different basis. Range sheepmen operate on a scale which enables them to ship freely in car lots, often by trainloads, especially when two or more men ship together. Moreover, the western sheepmen usually keep themselves well informed as to the markets, and their product has a uniformity of breeding and quality which proves a distinct advantage. At the same time, their thin lambs are in great demand for fattening in areas where grain and hay

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of western and native animals, has been shipped by about May 1, but they continue to reach the markets in most years during May in considerable numbers, and frequently until fairly late in June. A rapidly increasing percentage of the shipments after March 1 is previously shorn, and but a small percentage arrives unshorn at the markets after the middle or latter part of May. The former has been especially true during the recent years of very high wool prices. The marketing of fed sheep and lambs now extends over a considerably longer period than it did some years ago, when it was practically finished by the 1st of May.

Spring Lambs and Southwestern Lambs and Sheep.

Competing with the fed animals after about February 1 are shipments of "grass" lambs (nearly a year old), yearlings, and aged sheep from Texas and New Mexico. Some of these, often a large percentage, are too thin for slaughter and move to middle western pastures for further grazing. In April competition also begins with "spring" lambs from the early lamb section south of the Ohio River, from irrigated valleys in California and Arizona, and from Texas farms. The number of these is small until about June 1.

Movement of Range Lambs.

The movement of range lambs proper begins in June from the shed lambing areas of Idaho, is closely followed by similar lambs from Oregon and Washington, then from northern Utah and some from Wyoming. Shipments of lambs born on the deserts of central Arizona begin in July, when the movement of early lambs from south of the Potomac and Ohio Rivers has already reached its height. Practically all the lambs of the latter section are marketed by the middle of August, as are the rather limited numbers of early lambs from parts of the East and Middle West. These come largely from eastern Maryland, southern Indiana, Missouri, and southern Michigan.

By the 1st of August, or soon after, shipments from country and range points have become so large that the consuming demand is fairly well supplied, and the percentage of thin lambs in the western shipments, owing to poorer summer grazing available for them, is much greater. Thin or only half-fat black-faced range lambs from early lambing areas then begin moving out to the farms for a brief period of further finishing, and reappear on the markets after 8 to 14 weeks.

The range run normally is at its height by the latter part of September and starts to decline after the latter part of October. The fat range lambs are all marketed by November 1, and the peak of the range run sees practically the last of the black-faced lambs shipped.

The lambs of straight Merino breeding, or the Merino-longwool crossbreds, are usually separated out at weaning time in the fall of the year. These lambs are raised in areas where the feed is too sparse to produce many fat lambs. Most of the ewe lambs are retained by the grower or are sold to local growers or dealers for breeding purposes. The shipping of wether lambs begins in September. The heaviest shipments come in October and November, and by December practically all have been marketed. A considerable percentage of the late lambs in the Pacific Coast States and a few from the bordering States are sold in the Pacific coast markets, but western lambs are, as a rule, sent eastward. Some are fat enough to go directly to the butchers, while others coming from near the irrigated districts are retained for a short period to graze on beet tops and other crop refuse. The greater number of these late lambs, however, are too thin for slaughter when shipped, and are either sold to local feeders after arrival at the central markets or sent direct to feed yards from range points.

It is estimated that in Washington and Idaho 70 per cent, in Colorado, Utah, and Arizona 60 per cent, in Wyoming 50 per cent, in Oregon and Nevada 40 per cent, and in Montana 30 per cent of the lambs are fat enough for slaughter when they leave the range. In New Mexico and southwest Texas, where the spring range is uncertain and the summer feed somewhat sparse, only about 20 to 40 per cent of the lambs leave the range fat enough to kill.

Disposal of Range Ewes.

The sheepmen generally go over their flocks once a year and sort out all ewes not suitable to retain for breeding purposes. This is usually done in the fall, at the same time that the lambs are separated out. A considerable number of the southwestern ewes which are to be discarded are bought by irrigation farmers, principally in the Salt River Valley, Arizona, and in Imperial Valley, California, and bred to Down rams for the production of early lambs. These lambs run with their dams on alfalfa fields (sometimes on the deserts after about Feb. 1 in Arizona) until they are ready for slaughter in April or May. Some are sent to Pacific coast markets, but in recent years most of them have usually been shipped eastward. The ewes are then fattened on alfalfa and sold.

Some of the discarded range ewes are taken by local feeders, but most of them are shipped to eastern markets during the period of greatest movement from range points. The fatter ones are taken by butchers and the remainder, if not too old, are purchased by farmers for breeding purposes. The worn condition of their teeth makes them no longer suitable for range use, but a considerable proportion of them will last another year or two on the richer farm pastures

and will raise good lambs. Many corn-belt farmers, in preference to keeping permanent flocks, purchase western ewes, produce a crop or two of lambs, and then send both ewes and lambs to market. Many western ewes find their way to the early lamb-producing districts of Kentucky, Tennessee, and Maryland, where they usually give excellent results. About 25 per cent of the stock ewes shipped into Kentucky and Tennessee are raised on the range. A good many are taken by eastern farmers for the purpose of building up their farm flocks. They are usually very popular for this purpose, as they are comparatively free from disease. They are also in favor among hothouse lamb producers.

Autumn Farm States Movement.

The period of greatest movement from range points—September 1 to December 1—is also the period of greatest movement of native lambs from country points to the eastward of the range States. In the Middle West probably 65 per cent are sold at that time, and in the East about 60 per cent. Such concentration and competition in movement to market have a logical effect on the prices received by the growers. Farm States lambs, moreover, are seriously lacking in quality and uniformity, and being mainly of Down type are more liable to be infested with internal parasites (mainly stomach worms). They are more susceptible to this disease than are "native" (farm States) Merinos or the crossbred range animals during the brief time the latter may be held in feed yards. The native Downs, therefore, have practically no market except through the slaghterhouse, as lamb feeders will seldom consent to handle them. Healthy farm States ewes of desirable type, if not too old, normally find a ready sale for breeding purposes in early lamb sections. Fat ewes and those not desirable for breeding purposes are butchered.

FATTENING SHEEP FOR MARKET.

Fattening sheep for market is important in supplementing the breeding operations of fleece States and range shepherds. It also largely augments the domestic wool clip and raises the average quality of the mutton supply. It originated in the East probably 150 years ago. New Jersey farmers were active in supplying mutton to the New York and Philadelphia markets even prior to the War of the Revolution, and probably purchased part of their sheep in contiguous territory for fattening to acceptable weights. It was extensively done in many parts of the East for 30 years prior to 1860, usually at a good profit, because low prices in the fall, when the market was glutted were followed by a substantial rise in price of fresh mutton in the winter and spring. The practice has been abandoned almost entirely north of the Potomac River. Tobacco

growers in the Connecticut Valley fed quite extensively during the seventies to secure manure for their high-priced tobacco land.

The commercial fattening of western sheep began in Nebraska, Kansas, Iowa, and Minnesota in the eighties. Sheep fattening was first taken up by large operators who owned or leased plants capable of holding several thousand head. These were located at convenient points along the railroads. While some of these men were sheepman who brought their animals East to be finished, the greater number were speculators who not only bought the sheep but also all their feed. Minnesota feeders used large amounts of wheat screenings from the flour mills. At first the sheep fattened were wethers driven or shipped in from the western ranges. Later, as the demand for lamb increased, and the wethers began to disappear, the range men began to ship lambs. The commercial feeders then took up the fattening of lambs. This transition, which began in a small way as early as 1890, continued until about 1910. Since that time there have been comparatively few wethers in the feed lots.

In the earlier days sheep feeding in the Middle West proved quite remunerative. Consequently it was soon taken up by farmers who used it to furnish a market for part of their grain and as a means of converting some of their rough feed into manure. Such farmers were able to operate on a much closer margin of profit than large commercial or speculators, most of whom have been thus forced out of business. In recent years competition among farmers has been so keen that they frequently pay such prices for their feeder lambs as to make it almost impossible for any but careful buyers and feeders to realize any profit. While there have been years of large profits, there have also been a number of years when heavy losses have been sustained. However, men who have fed year after year have usually made money.

Sheep and lambs going to the feed yards are obtained in a number of ways. Some of the larger feeders buy directly from the range. More frequently, however, the lambs are contracted for in midsummer. Very often one of the leading feeders of a community, while buying his own supply, will purchase feeder lambs for his neighbors, charging a small commission. In that way shipments of trainload lots can be made, insuring a good run on special trains. Recently many lambs have been purchased through local sheep dealers in close touch with range growers. Twenty years ago approximately 20 to 25 per cent of the feeder lambs were purchased directly at range points. In recent years such purchases have constituted 35 to 40 per cent of the western lambs fattened.

These general lines of feeding practice still obtain. Fattening in corn-belt states, in the Northwest States, and sheep-barn fattening, west of the

Missouri River; and (3) fattening in barns, in the Middle Western States and in New York and Pennsylvania.

Fattening in Cornfields.

Many lambs are fattened in cornfields in eastern Kansas, Nebraska, northern Missouri, Iowa, Illinois, Indiana, Ohio, and southern Michigan. It is estimated that a million head were fattened in Iowa cornfields in the fall of 1919. Most of these lambs are purchased at the central markets, especially at Omaha and Chicago, in September and the first part of October—some in August and a very few even earlier. Lambs fattened in corn fields are, as a rule, the ones that are left after the packers have picked out those fit to kill.

These lambs on arriving at the farm are either turned into the pastures or given the run of the farm. They are often allowed to clean up the weeds and get the grass in the fence corners, lanes, and waste places. About the time the corn begins to harden they are turned into cornfields, where they at first graze on the weeds and lower leaves of the corn plant and then gradually work up to the grain. Rape, and in northern Missouri cowpeas, are often planted in the cornfield so as to increase the amount of green feed. As soon as the lambs are fat they are shipped to market, most of them going in December and January. Those held over until January are usually fed on pasture or in a yard for about a month previous to shipment.

Cornfield fattening is an economical practice. It saves the expense of harvesting the corn and a good deal of labor in handling the sheep, and little special equipment is required. There is, however, a heavier death loss. The lambs show a tendency to eat too much grain before becoming accustomed to it. In periods of bad weather, it is often necessary to remove them from the cornfield and finish them with ear or shelled corn on pasture. On the part of many feeders using this method, especially the newer ones, there is an inclination either to try fattening the lambs with too little grain or to ship them before they are "ripe," especially when there is much stormy weather.

Open-Yard Fattening.

More than half of the lambs fattened are finished in open yards. This practice prevails west of the Missouri River, where there is comparatively little stormy weather of a nature to bother the lambs, especially during the early part of the winter. As the sheep do not mind cold weather, the only shelter needed is a suitable windbreak. The yards are generally located on well-drained land, where there is as much natural shelter from the winds as possible. They are usually inclosed with dog-proof fences, and are subdivided into pens which hold about 500 head. Suitable equipment for the feeding of hay and

grain is provided, the type varying with the district and kind of feed used.

The most extensive feeding district is in northeastern Colorado, centering about Weld and Laramie Counties, where one-half to one million head are fattened annually. From a quarter to a half million head are fattened annually in the Scots Bluff district of Nebraska, and about one-quarter million in the Arkansas Valley of southern Colorado. Other extensive feeding areas are found along the Platte River in Merrick, Hall, and Buffalo Counties, Nebr.; and at Billings, Mont. Some feeding is also done in irrigated valleys of other Western States and until recent years it was extensively done in the San Luis Valley in southern Colorado. It is estimated that about 10 per cent of the lambs sold each year in Utah and Idaho are finished in local feed yards, and considerable numbers are finished at local points in Wyoming, Nevada, Oregon, Washington, and California. Some of these lambs are not fattened, in the sense that the Colorado feeders finish, but are run on grain and alfalfa stubbles. Such feeding is often supplemented by grain, hay, or both. Some are finished in yards on alfalfa hay for the Pacific Coast markets. Extensive use is also made of beet pulp in the neighborhood of sugar factories. Some of the animals finished west of Colorado are shipped to coast markets, especially from the Coast States.

In the main feeding districts, lambs are fed in bunches varying from a carload to 5,000 head or more. A few feeders handle as many as 30,000 head. These are generally extensive landowners, who parcel their sheep out among their tenants, seldom having more than 5,000 or 10,000 head in any one yard. The lambs usually arrive at the feed yards during September, October, and November. The northern range lambs generally weigh about 60 pounds, while the southern lambs weigh from 50 to 55 pounds. It ordinarily takes from four to five months to fatten a lamb. During this period the lamb will eat about 250 pounds of hay (usually alfalfa) and 150 pounds of corn, or its equivalent. Hay is delivered alongside the pens, while the grain is stored in adjacent granaries. One man can take care of 1,000 head.

In Colorado and other irrigated sections, corn usually has to be shipped in from Kansas and Nebraska. In these areas many of the feeders substitute other grains, such as oats, barley, and wheat, especially during the earlier part of the feeding season. In localities where there are beet-sugar factories considerable beet molasses is used in place of corn, this being mixed with the ground grain or hay.

A number of feeders, in addition to handling lambs and possibly a few wethers, also fatten old ewes. The ewes are generally fattened near beet-sugar factories on beet pulp and alfalfa hay.

As the lambs, especially those coming direct from the ranges, vary considerably in size and condition, they "ripen" at different times. Accordingly, it is customary to sort out the lambs and ship them in carload lots as they get ready. The first lambs may be ready in two, three, or four months, while some of the smaller ones will need to be fed for a period of six months. They usually weigh from 80 to 85 pounds, sometimes as much as 90 pounds, when shipped to market. However, they must not get too heavy, for when weighing in excess of 85 pounds they are usually discriminated against by the packers.

Some of the lambs are grazed on stubble fields and fed beet tops (crowns and leaves) and alfalfa for a month or more before being put on full feed and are then finished for the late market in April and May. Many of the late lambs are shorn before shipping. At one time packers paid little attention to the wool, buying the lambs solely on a mutton basis. In later years, since the high prices for wool have prevailed, they have considered carefully also the value of the fleeces.

The cost to the feeders of putting on a pound of additional weight is considerably more than the increase in the market value. Their profits, however, are not so much on the increased weight as on the higher selling price, which is secured by reason of the improved quality of the entire carcass. Investigations by the Department of Agriculture in 82 feed yards in Nebraska and Colorado, which fattened 166,000 lambs during the winter of 1917–18, show that the various costs in feeding a lamb are distributed as follows:

	Per cent.
Original cost of lamb	54
Feed	34
Marketing	5
Labor	4
Miscellaneous charges, such as taxes, risk, and various overhead expenses	3

Barn Feeding.

In the Central and Eastern States shelter is necessary, especially in northern Illinois, Indiana, southern Michigan, Ohio, and western New York, where there is a good deal of stormy weather in winter. In some cases, specially designed sheds capable of holding from 500 to 1,000 head are used. In most cases, especially in Michigan, Ohio, and New York, sheep are fattened in barns (particularly in basements) in lots of one or two carloads at a time. Most of these lambs are purchased in the central markets. Those finished east of Chicago are usually purchased at that point, and when fattened are shipped on to Buffalo or New York. In Ohio, Michigan, southwestern Pennsylvania, and some other localities native sheep and lambs are also fattened. Although they are generally not so popular as the western lambs, they are preferred by feeders who are accustomed to them. In less experienced hands, however, native lambs frequently do not make as good gains or finish as evenly as western lambs

and a heavier death loss, due primarily to stomach worms, is often incurred.

Feeders east of Chicago, especially in parts of Michigan, Ohio, and New York, because of more expensive feed and equipment, find it difficult to compete with those farther West. However, they need the manure to maintain the fertility of their farms. Lamb feeding also furnishes a gainful occupation during the winter months and gives a market for roughages otherwise less efficiently used. In the finewool areas, however, men who can raise sufficient grain to feed out their lambs have usually made more money than those who have sold their lambs in the fall.

SHIPPING PROCEDURE.

In sending range sheep eastward to the central markets and to the feed yards, the shipments as far as possible are made in trainload lots. Such stock trains are usually given special running schedules to expedite arrival. A few western flockmasters are able to consign in trainloads lots, but more often two or more men combine in making such a shipment. In case of small shipments the western roads, which ordinarily handle large volumes of stock, usually haul the cars to a divisional point on regular trains. At the divisional points, when practicable they are assembled into special stock trains to facilitate their movement. Specially constructed double-deck cars, which hold about 250 ewes or fat lambs, or about 300 feeder lambs, are generally used. Each class of stock is usually loaded separately except that it may be necessary to have one car or deck of sheep of various classes. That the animals may not stay on the cars longer than necessary, a definite loading time is designated. If the shipment comprises only one or two cars these are usually "spotted" at the loading chutes by the railroad. If the shipment comprises several cars or a trainload, an engine is furnished to help load.

The railroad traffic rules provide that shipments of two or more cars may be accompanied by a caretaker, who is furnished return transportation. In large shipments one man is allowed to every 10 carloads. Train schedules are arranged so that, as far as possible, the stock may arrive in the early morning, to be ready for that day's market. This, however, is not always possible for long shipments. The sheep which are shipped direct to the Colorado, Nebraska, and Kansas feed yards are usually billed through to the Missouri River or to Chicago with a permit to unload and feed for a period of from 90 to 150 days. When fattened, they are shipped on, the feeder paying local freight on the additional weight put on by the fattening process.

The Federal laws provide that all stock en route for a period of more than 36 hours must be unloaded, rested, fed, and watered every 28 hours, and remain at such points not less than five hours.

This time, in case of emergencies, may be extended to 30 or more hours, so as to get the stock to adequate feeding places. To meet this situation the western railroads have provided feed-in-transit stations, usually at divisional points. The stations are fitted with sheds and pens, where hay and corn, if desired, can be fed. Many of them have large acreages of pasture where western sheep and lambs can be grazed. The charge per car for care, feed, and water at these points includes loading and unloading and general responsibility for the stock. Some of the railroads operate these feeding plants, while others have them operated by private individuals.

Not only are there numerous "feed-in-transit" stations, but also large feeding plants tributary to the larger markets where the sheep can be fed and rested or held for an indefinite period and fattened. The stay at these places varies from 48 hours up to 30 days, and sometimes 90 days, when additional finish is to be given. Each of the leading western railroads has such a feeding station near Chicago. Some of these will hold 50,000 head of sheep and represent an investment of from one-third to one-half a million dollars. Most of these plants were built by speculators.

In recent years these stations have been used extensively as places where the sheep can be well rested, and when necessary can also be held for a few days for better market conditions. As the stations are usually only a few miles from the market, on notice from a commission firm the evening before, sheep can be loaded in time to be on the market the following morning. Most sheep held for further finishing in the late winter or early spring months are shorn before they are sent to market.

During the past few years western sheepmen have experienced much difficulty in getting their sheep to market in good condition. Frequently they have not been able to get cars when desired and have been obliged to hold the animals at some point for several days waiting for cars. In many instances there have been protracted delays en route and the sheep have been roughly handled. In all such cases there is not only a loss in weight but there is also a considerable loss in condition which seriously affects the selling price. To a considerable degree these delays have been due to the overburdened condition of the railroads and lack of sufficient equipment. Trouble from such causes is always much more severe in the fall, when large shipments not only of sheep but of other livestock are made.

The shipment of farm States or "native" sheep and lambs is almost entirely by car lots, and often in car lots with other kinds of live stock when moving to market from country points as against movement by trainloads from range points. Single-deck cars are

extensively used, but the railroads often double deck the shipments at division points. The same regulations govern the handling by carriers, but movement mainly by regular trains operates to slow up the shipments somewhat. On the other hand, the distances to be traversed are shorter, and shipping charges are less of a burden to grower and shipper.

THE MARKET CENTERS.

Development.

Until the middle of the past century the main live-stock markets were east of the Allegheny Mountains. New York, Philadelphia, Boston, and Baltimore were the principal centers. Stock was driven long distances to reach the markets. With the rapid development of the West and the extension of the railroads after the Civil War, the stock was marketed nearer the western centers of production. The invention, in 1868, of the refrigerator car made it possible to ship dressed meats from the West to eastern consumption centers. The adoption of the tin can for meat packing, about that time, contributed still further to the establishment of the meat-packing industry.

Chicago, where stockyards were opened in December, 1866, soon developed into the largest packing center. Others farther west were established soon after, the principal among them being the markets at Omaha, Kansas City, East St. Louis, St. Joseph, Sioux City, and St. Paul.

The Market Organization—Grades and Classes.

The four principal factors in a live-stock market are the stockyards company, the commission firms, independent buyers, dealers, shippers, and order-buyers, and the meat-packing concerns. It is the function of the stockyards company to provide suitable places for unloading stock, pens where the stock can be kept until sold, and to provide feed and water. The stockyards usually furnish office space for the various commission firms and others associated in the business. The commission firms are members of the local live-stock exchange, and are subject to its rules for the better government of the yards and the prevention of fraud. Since 1917 such firms have been licensed by the Federal Bureau of Markets and are subject to its regulations for the proper conduct of the business. The commission firms act as selling agents. They also fill orders for country buyers of stockers and feeders and may act for outside butchers. Some also act as loan agents and make extensive loans to many of their clients, particularly to sheep feeders. The function of the packing house is to convert the live animals into dressed meats, prepare the various by-products for consumption, and to distribute meats and by-products to consuming centers.

On arrival at the yards the sheep are usually delivered to the pens of the commission firm to whom they were consigned. There expert sheep salesmen take charge of them and sort them into suitable grades ready for selling. The main classes and subclasses of sheep (according to the use to which they are put) are as follows:

Mutton sheep (native and western sheep).—Lambs, yearlings, wethers, ewes, and bucks and stags.

Feeder sheep (western sheep).—Lambs, yearlings, wethers, and ewes.

Breeding sheep.—Ewes and bucks.

Each of these subclasses, except bucks and stags, is again divided into from three to five grades, according to the condition of the animal. Lambs, for instance, are divided into prime, choice, good, medium, and common or culls. Usually they are designated as "natives" or "western"; as, for instance, "native lambs, choice to prime." Native sheep are mostly grown in small lots on eastern farms, while western sheep are those coming from the western ranges.

Market Procedure.

As soon as the sheep have been sorted they are offered for sale. At a large market, such as Chicago, the fat sheep may be taken by local packers or butchers, or may be purchased by traders for filling eastern orders. Each packer has one or more expert buyers who look over the sheep and bid for those most suited for filling his orders for the day. While the sheep are bought primarily for slaughter, the buyer considers the quality and weight of fleece as well as the quality and weight of the carcass in making his bid. Stockers (breeding animals) and feeders are similarly handled. As buyers (sheep feeders or their representatives) for this class are more numerous, competition for these animals often is much keener than for fat sheep.

As soon as sold the sheep are driven to the stockyard scales and weighed. Those going to the packers are driven to their pens, while those sold for out-of-town delivery are driven to the loading pens to await shipment. The packers usually make payment to the commission firm the same or the following day. The latter, after deducting all expenses such as freight, switching charges, yardage, feed, and their own charges, transmit to the consignor a check for the remainder, together with a financial statement of the transaction.

MARKET RECEIPTS OF SHEEP AND LAMBS.

Receipts at the market centers show a serious congestion during the fall months. This is presented statistically in Tables XXXV and XXXVI. The first column in Table XXXV, headed "Total receipts," gives an excellent idea of the size of the 30 principal sheep markets so far as concerns the handling of sheep and lambs. The second and third columns, showing local slaughter at, and total ship-

ments of live animals from, each market suggest that receipts alone are not the best measure of the importance of many market centers. Total shipments include animals which are forwarded to other markets and to outside butchers, and also stocker and feeder shipments (shown in column 4), which may go to one or more other markets before reaching the hands of sheep and lamb feeders for further finishing. Then they are returned to one of the markets, and may again be reforwarded before final slaughter. Some of the centers reported as markets really are little more than magnified feeding and resting stations. Pueblo, with no local slaughter and only a limited market for stockers and feeders, is a striking example.

Chicago is the largest sheep market in receipts and slaughter, but ranks third as a stocker and feeder market. Omaha, second in receipts and slaughter, is the leading market for stockers and feeders. Denver ranks second for stockers and feeders, third in receipts, and very low as a slaughter point, because most of the fat sheep and lambs are shipped to more centrally located markets. Jersey City ranks fifth in receipts, but, being almost exclusively a slaughter market, it stands third in number butchered.

TABLE XXXV.—*Receipts, local slaughter, total shipments, and stocker and feeder shipments, 30 principal markets.*

(Annual average, 1916-1918.[a])

Market.	Total receipts.	Local slaughter.	Total shipments.	Stocker and feeder shipments.[b]
Chicago	4,171,996	3,214,982	957,014	689,476
Omaha	3,191,078	1,560,327	1,630,752	1,308,457
Kansas City	1,641,396	1,004,567	627,543	523,957
Denver	1,706,889	128,769	1,577,672	897,383
Jersey City	1,323,298	1,323,298	.....	.....
St. Joseph	770,223	558,400	211,860	115,657
St. Paul	561,011	148,508	422,254	113,576
Sioux City	325,134	196,755	129,512	92,648
Cleveland	314,724	131,318	183,406	.....
Detroit	286,536	167,438	119,098	4,554
Indianapolis	104,754	22,614	82,141	[c] 4,800
Milwaukee	53,446	36,928	16,517	2,010
Buffalo	894,498	147,995	746,503	17,528
Pittsburgh	484,410	96,854	382,957	.....
East St. Louis	579,426	505,055	74,371	43,988
Cincinnati	292,375	60,809	231,566	3,772
Louisville	290,706	23,221	267,485	[e] 26,644
Nashville	85,030	7,596	77,550	3,204
Baltimore	329,124	78,996	250,128	1,500
Philadelphia	232,861	[d] 219,572	[e] 13,500	.....
New York	149,371	149,371	.....	.....
Portland, Oreg.	153,829	91,851	64,117	19,999
Pueblo [f]	789,475	.....	784,649	.....
Ogden	401,582	25,319	376,263	21,167
Salt Lake	394,667	28,319	367,378	140,557
Fort Worth	390,439	154,610	227,204	103,165
Cheyenne [f]	290,559	.....	290,559	.....
Amarillo	122,839	.....	122,839	48,430
Oklahoma City	65,602	37,744	27,349	[g] 15,000
Wichita	29,361	3,133	26,228	9,249

[a] Annual average under the different headings for 1916-1918, inclusive. Figures supplied by the Bureau of Markets, U. S. Department of Agriculture.
[b] Included in column 3.
[c] 1918 only.
[d] 2-year average.
[e] Estimated 2-year average.
[f] Slight discrepancy in data.
[g] Estimated.

Table XXXVI shows the average monthly receipts in the form of percentage of total annual receipts for the markets shown in Table XXXV. The seasonal movement of sheep and lambs at each market can be noted readily. Table XXXVI taken in connection with Table XXXV shows that 10 or 12 of these markets account for most of the seasonal congestion in sheep and lamb marketing, and that a still smaller number hold the key position. Table XXXVII, therefore, is presented to show the importance of the 11 leading markets and brings out more clearly the congestion in the fall months. These 11 markets handle 88 per cent of the receipts reported for the 30 markets in Table XXXV and also slaughter 88 per cent of the total slaughterings for the larger group, or 86 per cent of the annual total killed under Government inspection during 1916–18 inclusive. These 11 markets, except Jersey City, are in or virtually on the edge of the corn belt. Table XXXVII shows the monthly receipts at each of the 11 markets and the percentage of total annual receipts which arrives each month at all markets in this group. During September, October, and November, these 11 markets handle 40.3 per cent of their annual total, or 33 per cent of the annual total at the 30 markets shown in Table XXXV. The strain put on market and transportation facilities by concentration of market receipts during the fall months in connection with movement of other live stock and farm products is quite evident.

TABLE XXXVI.—*Percentage of total annual receipts at 30 principal markets during each month.*[a]

	January.	February.	March.	April.	May.	June.	July.	August.	September.	October.	November.	December.
Chicago	7.4	6.7	6.7	6.6	5.7	6.2	6.9	8.5	11.8	13.7	10.8	8.9
Omaha	7.7	6.3	6.5	4.9	3.5	3.4	5.5	10.9	19.6	16.9	7.5	7.2
Kansas City	9.9	8.0	7.8	6.6	8.4	6.8	4.8	5.9	13.6	14.1	6.7	7.2
Denver	2.3	4.1	4.1	2.5	1.5	2.3	3.9	5.2	17.2	27.1	22.2	6.8
Jersey City	6.0	4.6	4.7	5.7	5.9	9.4	11.6	14.3	10.5	10.5	10.6	6.3
St. Joseph	10.1	11.1	12.3	8.5	5.0	5.5	5.7	6.7	11.3	10.5	6.1	7.2
St. Paul	9.2	6.7	3.8	1.5	1.1	.9	1.9	4.0	14.7	29.8	18.9	7.6
Sioux City	8.9	5.7	4.2	2.3	2.1	2.5	3.8	9.8	13.1	19.0	14.1	13.6
Cleveland	9.2	5.6	4.2	6.0	5.3	5.7	5.7	11.3	9.7	11.3	14.3	11.9
Detroit	11.8	10.0	5.5	3.6	4.0	2.0	1.8	5.7	10.4	13.7	19.9	11.8
Indianapolis	5.6	4.4	2.6	1.6	3.4	7.4	13.8	18.5	15.0	13.2	8.0	6.6
Milwaukee	5.2	5.4	3.7	2.9	1.5	4.2	5.1	12.1	15.0	17.1	19.2	8.6
Buffalo	9.7	8.9	9.7	8.7	10.6	4.0	3.2	5.3	8.1	10.1	11.6	10.2
Pittsburgh	8.3	6.5	5.5	8.3	8.0	5.9	8.8	13.8	8.8	8.3	9.6	8.2
East St. Louis	5.9	4.7	4.7	4.3	8.0	14.2	14.3	12.7	9.2	8.8	7.0	6.1
Cincinnati	1.1	1.0	.8	.9	3.5	18.9	24.6	31.1	9.1	4.4	2.9	1.5
Louisville	.2	.2	.2	.6	7.1	32.4	36.9	15.9	4.0	1.5	.6	.3
Nashville	.7	.5	.8	2.0	7.7	51.7	22.9	6.8	3.2	1.7	1.4	.8
Baltimore	1.7	1.6	1.5	1.9	2.6	11.2	15.6	24.8	13.1	12.3	9.6	4.0
Philadelphia	6.6	5.4	5.4	6.1	7.6	9.1	9.9	12.0	10.7	9.4	10.3	7.5
New York	12.2	13.5	11.6	7.4	8.3	.8	.2	1.1	9.9	11.8	12.8	10.2
Portland	8.4	4.6	5.4	3.0	7.3	13.0	10.2	10.1	11.7	11.3	7.8	7.3
Pueblo	8.2	4.0	2.2	.9	.3	1.0	.5	3.3	22.7	32.2	17.7	6.9
Ogden	2.5	1.4	2.2	4.2	13.1	8.2	4.0	17.1	24.2	12.5	5.3	5.3
Salt Lake	2.9	4.3	4.3	22.2	7.9	7.3	5.9	3.9	8.7	15.5	12.7	4.4
Fort Worth	3.2	4.3	5.4	8.9	23.3	14.0	9.1	7.1	7.3	7.6	4.4	5.5
Cheyenne	2.8	1.7	1.6	1.6	2.0	3.2	4.2	17.5	34.3	22.8	6.8	1.5
Amarillo	2.0	.9	2.9	2.4	8.5	9.8	5.2	8.5	13.4	17.8	23.5	5.2
Oklahoma City	10.1	4.8	4.3	2.8	14.9	4.4	3.8	9.2	16.6	12.6	8.9	7.7
Wichita	8.5	3.2	4.1	3.3	13.6	5.1	4.8	6.6	12.6	13.6	15.1	9.4

[a] Based on data supplied by the Bureau of Markets, U. S. Department of Agriculture, for the years 1916–1918, inclusive.

TABLE XXXVII.—*Monthly receipts and percentage of annual total received each month, 11 largest markets.*[a]

	January.	February.	March.	April.	May.	June.	July.
Chicago	309,773	280,037	281,004	274,048	238,989	258,284	289,445
Omaha	244,605	200,506	208,394	156,983	112,857	108,362	176,692
Kansas City	163,268	131,102	128,125	109,050	138,196	111,739	79,165
Denver	49,821	70,991	71,086	43,209	26,324	39,341	66,941
Jersey City	78,873	61,550	61,706	75,060	78,557	124,046	153,548
St. Joseph	77,751	85,218	94,905	65,491	38,225	42,207	43,821
St. Paul	51,494	37,401	21,424	8,228	6,381	4,742	10,475
Sioux City	28,828	18,455	13,558	7,412	6,758	8,072	12,496
Buffalo	86,786	79,963	86,390	77,745	94,537	35,336	28,571
Pittsburgh	40,288	31,388	26,778	40,052	39,018	28,505	42,411
East St. Louis	34,013	27,259	26,981	25,015	46,491	82,525	82,909
Total at 11 markets	1,165,500	1,023,870	1,020,301	882,393	826,343	843,159	986,464
Percentage of total receipts by months	7.6	6.6	6.5	5.6	5.3	5.4	6.3

	August.	September.	October.	November.	December.	Total.
Chicago	356,266	493,353	572,658	448,311	369,829	4,171,996
Omaha	349,056	624,940	539,254	240,570	228,849	3,191,078
Kansas City	97,363	222,501	231,880	110,610	118,397	1,641,396
Denver	58,769	293,111	462,084	378,828	116,323	1,706,889
Jersey City	189,279	138,479	138,799	140,699	82,703	1,323,298
St. Joseph	52,214	86,892	80,928	46,710	55,862	770,223
St. Paul	22,630	82,393	167,485	105,828	42,530	561,011
Sioux City	31,741	45,915	61,780	45,963	44,346	325,134
Buffalo	47,017	72,747	90,598	103,880	90,991	894,498
Pittsburgh	66,681	42,567	40,373	46,494	39,855	484,410
East St. Louis	73,694	53,294	51,000	40,620	35,624	579,426
Total at 11 markets	1,344,720	2,156,192	2,436,777	1,708,333	1,225,309	15,641,359
Percentage of total receipts by months	8.6	13.8	15.6	10.9	7.8	.....

[a] Based on data supplied by the Bureau of Markets, U. S. Dept. of Agriculture, for the years 1916–1918, inclusive.

Figure 1 (page 279) shows the concentration of receipts at the 11 leading markets given in Table XXXVII. The striking disparity between receipts and local slaughter during the autumn suggests the advisability of a readjustment in marketing procedure, as far as possible, if the shepherds are to stabilize market prices and increase flock profits.

The uneven seasonal distribution is even more strikingly shown in Figure 2 (page 280), which is a presentation of the monthly receipts at the five leading markets. The peak of the movement to market is reached first at Omaha, because of its strategic location with reference to the bulk of the northern range country and its location in the heart of the feeding territory. Chicago's receipts reach their peak a little later, owing in part to the direct, main-line railway connection between these two centers and the chance for prior disposal at Omaha from virtually the same contributory region, and in part to Chicago's location in the center of the sheep-raising country north of the Ohio and Missouri Rivers. In this area the abundance of feed and nearness to shipping points make it possible to hold sheep

and lambs longer at country points than in the range States.[4] The peak load reaches Kansas City at practically the same time that it reaches Omaha and lasts longer, primarily because of its location with reference to the southwestern ranges. The brief upward movement at this market in May results from receipts of aged lambs, yearlings, and older sheep from Texas and New Mexico, and early lambs from the Southwest and southern California. The marketing crest reaches Denver later than Omaha because a large percentage of the receipts comes from the Southwest where the animals can be held

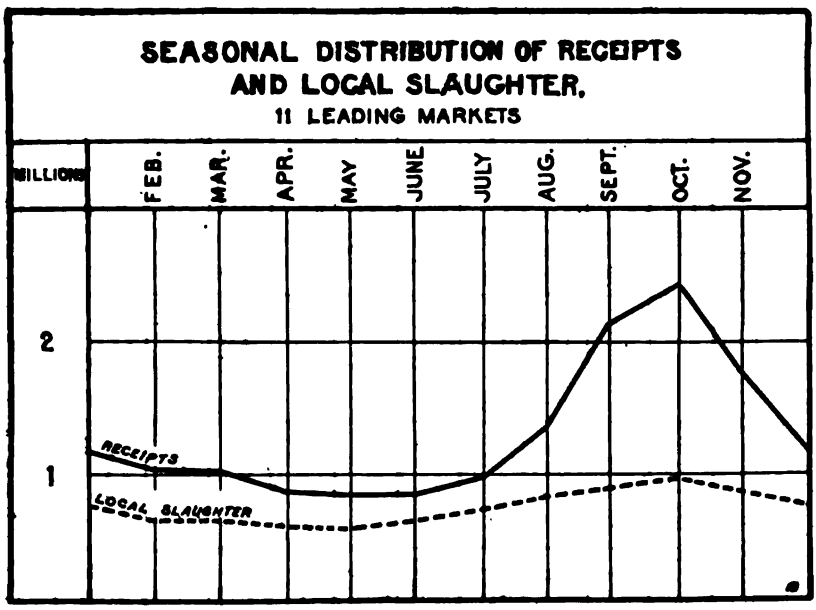

FIG. 1.—Seasonal distribution of receipts and local slaughter, 11 leading markets.

longer, until Colorado feed yards are ready for them. In addition, Denver is primarily a feeder market, and logically draws more heavily on the later part of the marketing movement, which contains the bulk of the feeder sheep and lambs. The peak load arrives in Jersey City in August mainly because of heavy arrivals of early lambs from country points and other market centers. As Jersey City is almost wholly a slaughtering point, the curve is smoother than at the other markets.

[4] On the range the bulk of the surplus sheep and lambs must be shipped as soon as driven out of the mountains by snow. There is not enough grazing to hold back many of them in most range sections. Most of the grazing which is available on irrigated and dry-farm land is needed for the breeding bands or for the winter use of these bands. True, winter range near shipping points will rarely fatten sheep in any case. Owing to the topography, sheep in the Middle West can be held in pasture and stubble fields until the forage is buried under the snow, if need be, because the breeding stock has an abundance of roughage for winter use. When the sheep are shipped, the drive to loading point is quite short.

Stocker and Feeder Shipments.

Figure 3 (page 281) shows the seasonal distribution of stocker and feeder shipments (mainly feeder lambs) from the four leading markets. This movement lasts from August to December. The May-

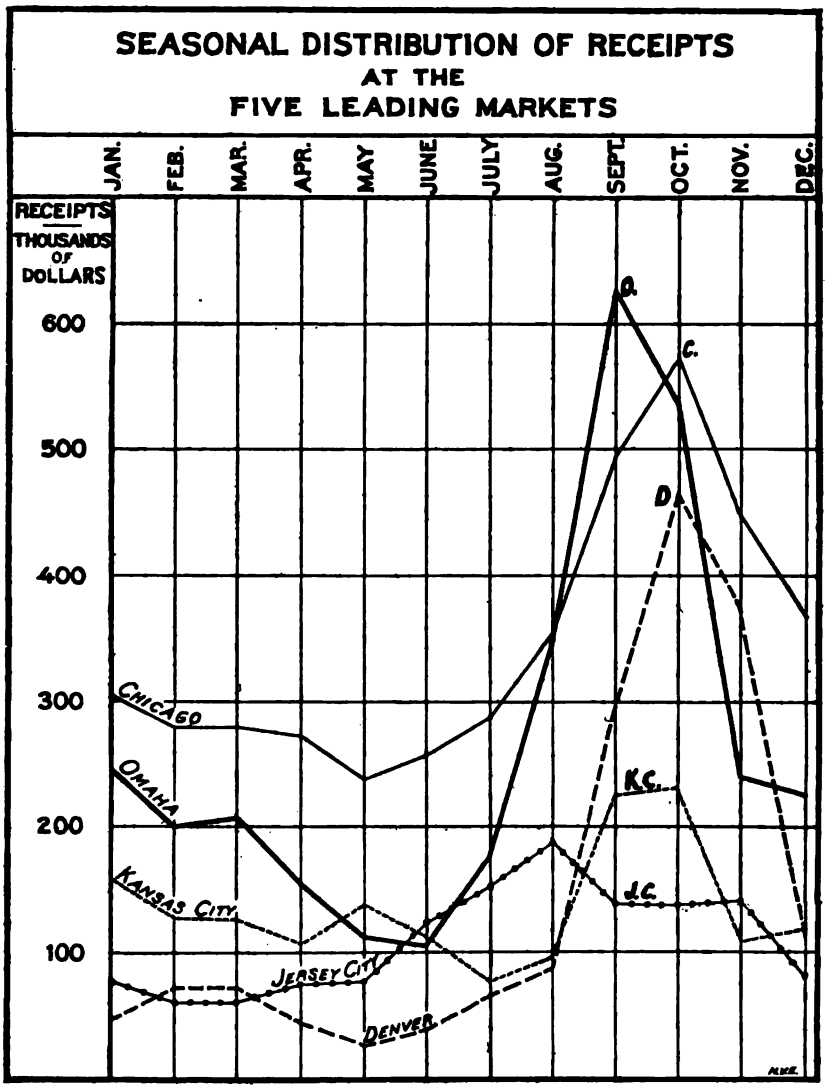

FIG. 2.—Seasonal distribution of receipts at the five leading markets.

June rise at Kansas City is accounted for by movement, mainly to pastures of the Central West, of thin range sheep and yearlings shipped from Texas and New Mexico after the winter grazing begins to get dry. At Denver the June–July rise results mainly from east-

ward movement of yearlings and aged ewes wintered and shorn at western points and then shipped to or routed through Denver. These are mainly stock sheep to be used for breeding purposes to the eastward. Figures 2 and 3 bring out very clearly the strain put on the marketing and transportation agencies by the movement of such a volume of live stock in so short a time during the fall of the year.

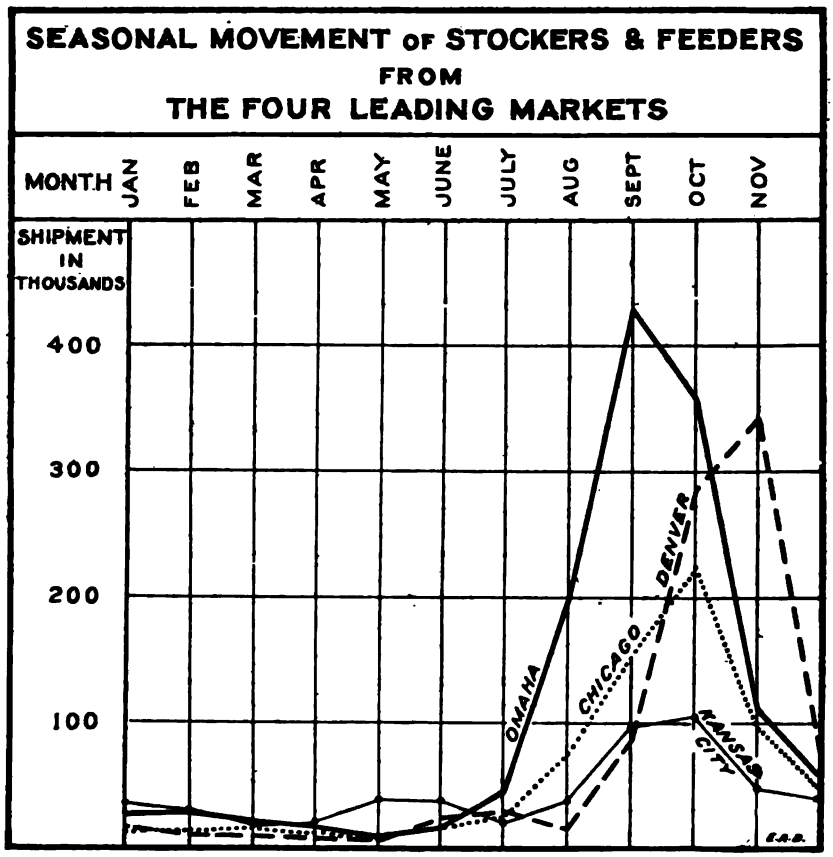

FIG. 3.—Seasonal movement of stockers and feeders from the four leading markets.

Local Slaughter at Market Points.

Figure 4 (page 282) indicates the seasonal distribution of slaughterings at each of the four chief slaughter markets. Chicago, Omaha, Jersey City, and Kansas City slaughter 80 per cent of the number killed at the 11 markets enumerated in Table XXXVII and 70 per cent of the total butchered at the 30 markets shown in Table XXXV. A composite curve, such as the lower curve in Figure 1, is an excellent visualization of the seasonal distribution of most of the slaughtering done, but it disguises the real importance of Chicago, which butchers one-third of the sheep and lambs slaughtered under

Government inspection. The concentration of slaughterings at Chicago in the fall months (practically one-third of the annual total in September, October, and November) seriously affects prices to the producer. The market is flooded with sheep and lambs which must be butchered and with feeder animals which are available to packers as well as to the feeder buyers. Prices therefore are depressed, and those paid at Chicago largely determine the price level at other markets. Fortunately for the American shepherds, the thin western lambs are suitable for fattening by the farmers of the Middle and Central West. The burden placed on the packers is thus lightened considerably. Otherwise autumn prices would drop to a far lower level than is now the case. As it is, the quality of a large proportion of the native sheep and lambs which must be slaughtered during the fall months accentuates the price drop which would result in any case from the concentration of slaughterings here shown. In order to take care of this autumn surplus, considerably more is frozen per month at that time than during the rest of the year, but the percentage frozen is very small. Because American consumers hitherto have not taken kindly to frozen meats, the great bulk of these receipts must be chilled and put on the consuming markets immediately, as chilled mutton can not be held more than

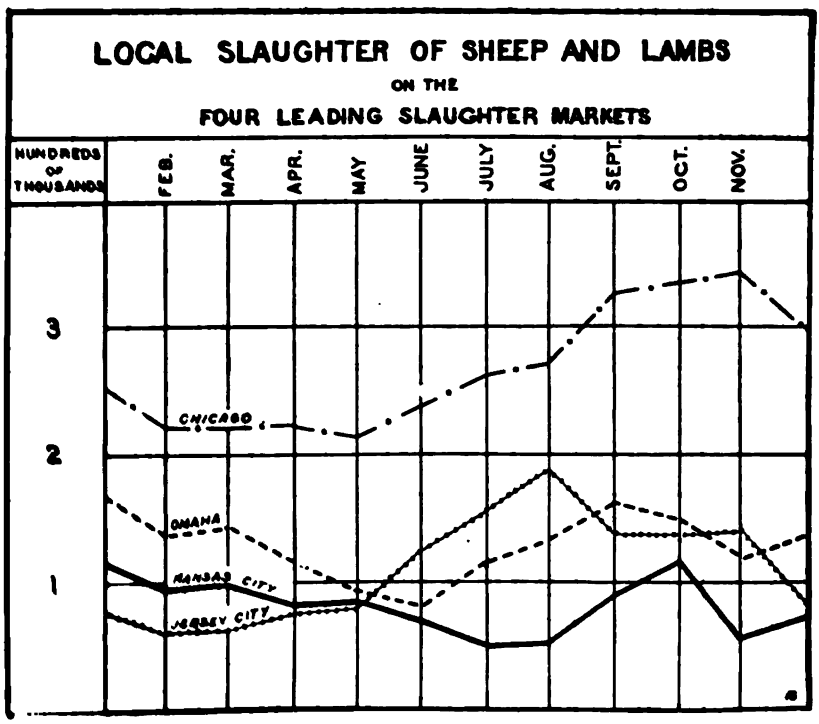

Fig. 4. Local slaughter of sheep and lambs on the four leading slaughter markets.

about three weeks except in cold weather. It would be a considerable aid to market stability if larger quantities could be frozen during the fall months for subsequent issue to the trade.

The Early Lamb Markets.

Figure 5 shows more clearly the receipts and local slaughter at the early lamb markets and at Fort Worth, which is typical of those south of Kansas City and East St. Louis. With the exception of East St. Louis, these markets—Nashville, Louisville, Cincinnati, East St. Louis, and Fort Worth—are mainly reforwarding points between the producer and the consuming markets. This is

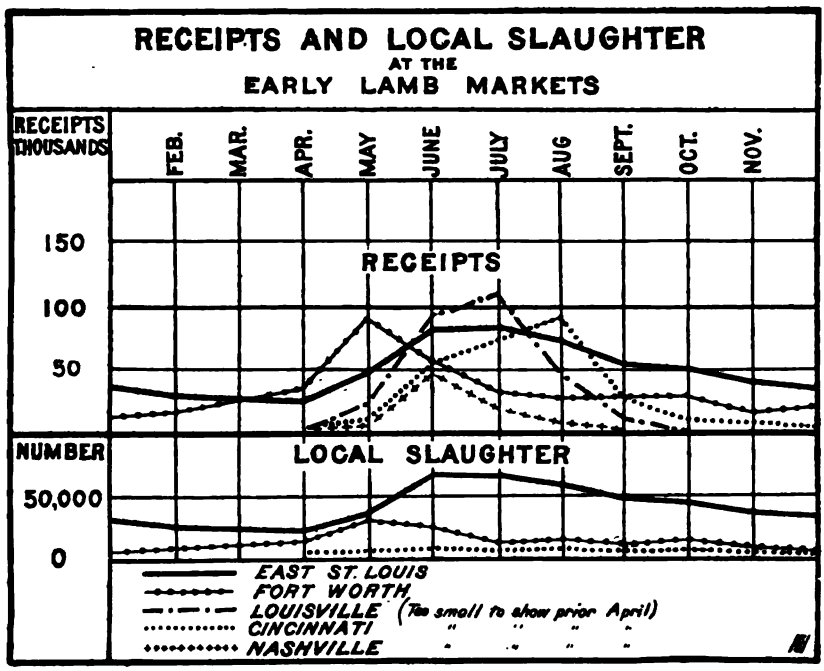

FIG. 5.—Receipts and local slaughter at early lamb markets.

well shown by the lower part of the graph, which depicts the local slaughterings as against the receipts shown just above them. The peak of the market run is reached earliest in Fort Worth, owing chiefly to the movement of yearlings and wethers from the Texas ranches. Sheep reforwarded from this market go mainly to Kansas City and East St. Louis. The peak is reached in Nashville and East St. Louis earlier than in Louisville and Cincinnati because of the location of the two former with reference to the early lamb producing areas of central and western Tennessee, southwestern Kentucky, and southern Missouri. Lambs in central and northern Kentucky and southern Indiana reach Louisville and Cincinnati later

because of the more northern location of these producing sections. All but Fort Worth (though to a less extent East St. Louis) ship a considerable percentage of the receipts to Jersey City, which also gets most of the early lambs from southwest Virginia.

MARKET PRICES—EFFECT OF SEASONAL SUPPLY AND QUALITY.

Just as the market receipts show a wide seasonal variation, so variations in quality are equally wide. In general, the average quality of the animals is lowest when the receipts are most numerous. The effect of both factors on prices is very serious.

Quality of the Mutton Supply.

Beginning with January 1, and continuing until May 1, the bulk of the mutton and lamb supply consists of fat animals from the feed yards west of the Alleghenies. These are fairly uniform in quality compared with arrivals later in the year, though a great many of those received after about March 1, particularly with the high wool prices of recent years, have been fed for a heavy fleece (which is generally shorn before slaughter) rather than for prime to choice lamb and mutton. Prices paid are higher than later in the year because of the higher average quality of the animals. The first spring lambs to reach the market in April and May also average fairly high in quality, particularly the Arizona and California arrivals, and being few in number sell at very good prices. With an increase in receipts the price declines, but it remains at a distinctly remunerative level. Arrivals for slaughter from Texas and New Mexico during April, May, and June are of good quality, but almost all are a year old or more, and do not compete directly with the very early native lambs, which enter only into luxurious consumption channels. The range lambs which arrive during and after June are more uniform in breeding and in quality than corresponding receipts of natives. But arrivals from both sources are small and very few westerns, even if fairly thin, go out as feeders prior to August, because the demand in consuming centers for these lighter " handy weight " animals is too great. An increasing number of the western lambs arrive only in medium to fair condition after about August 1; as market receipts are then steadily rising, there is a rapid movement of western lambs in feeder condition to the feed yards. Suitability of the thin western lambs for fattening enables them to sell far above natives, and to improve the average quality of the mutton supply when returned from the feeding yards. The thin natives which flood the markets after September 1 are almost entirely unacceptable for fattening because of lack of uniformity, failure to dock and castrate, and susceptibility to diseases, such as the stomach

worm.[8] These lambs must be slaughtered at once, and the markets are thus glutted with undesirable lamb and mutton and the prices are depressed for all receipts during the fall months.

Market Prices.

Chicago prices, modified primarily by differences in shipping charges, largely determine the price level at other markets, although temporary differences in supply and demand frequently cause appreciable divergences from the normal price differential. Differences in quality may also affect the normal differential between Chicago and other markets on a given day. The Chicago price varies from day to day and from week to week, and these variations are often quite wide. They frequently cause heavy losses, especially to sheep and lamb feeders.

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[8] The low quality of autumn receipts of natives results primarily from failure to dock all lambs and neglect to castrate the males. Docking and castrating are conspicuously present in areas where finewool sheep have been retained in whole or in part, and are conspicuously absent in most other parts of the fleece States region. Failure to dock results in very dirty hindquarters, which may not only hamper the lambs in their growth, but always injures their appearance on the market. They are unattractive to killers, and quite apart from other considerations, sheep feeders will seldom consent to handle them. Failure to castrate the males also results in inferior market animals unless slaughtered by 4 months of age. After that time they begin to develop the sex instinct and to become heavy in the neck and shoulder, where the cheapest meat cuts are located, and relatively light in the loin and hindquarter. With the development of the sex instinct they also lose their "baby" fat and rarely replace it with other fat. Their meat also gets coarse and undesirable. At the same time they worry ewe lambs to a point where the latter lose flesh or are prevented from putting on flesh. This results in the entire lot selling considerably below good to prime native lambs. The price cut on buck lambs often is as high as 50 per cent of the price of native tops. In 1919, according to American Sheep Breeder and Wool Grower, April, 1920, 80 per cent of the native lambs reaching Chicago were uncastrated and undocked, and not over 10 per cent of the males had been altered. This was a larger percentage than ever before, and probably was due to the numerous beginners in sheep husbandry who had stocked up in 1918. A large percentage of the bucky lambs sold at $7 to $8 per 100 pounds in September and October of 1919, when native tops were bringing $14 to $15. The neat, blocky appearance of the docked and castrated western lambs is in striking contrast to most of the natives. The former sell for more on the hoof, but their higher quality gives a heavier carcass from the same live weight. The carcass is in every way more desirable and has a larger proportion of the higher-priced cuts. This type of lamb often is considerably cheaper on the hooks in the cooling room. In the case of coarse, bucky lambs, it frequently is difficult to cut the price on the market sufficiently to offset their undesirable carcass and low dressing percentage.

It is a question whether failure to dock and castrate is due more to indifference than to ignorance. Some growers dock the females and only alter the males. Others do neither, claiming that the animals are checked in their growth. There is no merit whatever in such a contention if the lambs are properly trimmed within two weeks after birth. Such lambs at 3 months of age are fully as heavy as those not cut but of similar breeding and kept under the same conditions. At four months of age, which is the time when most of the early lambs begin moving to market, they are somewhat heavier, and at five to six months of age they average 5 to 10 pounds heavier than the untrimmed lambs. While it is true that local country buyers often do not discriminate, when the lambs reach the market the docked and castrated loads always outsell uncut loads of the same weight and finish. On the average, the superior and more uniform quality and breeding of the western lambs enable them to outsell the natives considerably. However, well-bred, altered, and trimmed natives of equal quality sell on a par with western tops at the same weights. They are in a very small minority in the market receipts, and the buyers are always glad to pay a premium for them.

Age, quality, and weight, aside from variations in supply which have only a temporary effect, are the chief factors in determining differences in price between grades and classes of sheep and lambs. Because of the preference for lamb, sheep always sell for less than lambs. Spring lambs (marketed at 3 to 5 months of age, mainly between April 1 and August 1) practically always outsell older lambs, which are about 1 year of age at that time. Preference of the consuming public for light to medium weight cuts rather than heavy cuts also enables yearlings, frequently retailed as lamb, to outsell aged sheep. The latter are used mainly by the cheap restaurant trade.

Early Lamb Prices.

Figure 6 (page 287) shows the monthly prices of "firsts," or top quality lambs, at Louisville, and choice to fancy native lambs at Chicago during 1919 and 1920. The superior price of "spring" lambs, until about July 1, when equally or more desirable range lambs appear in quantities on the Chicago market in competition with the native spring lambs (which by that time are quoted as straight natives) is fairly well shown in this figure. It should be noted, however, that lambs other than "spring" which reach Chicago prior to July 1 have often been shorn just previously, and that this affects their price and the average price. The price of the limited arrivals of spring lambs at Chicago parallels that at Louisville. The dotted lines in the figure show the extreme drop from the April price (for very limited arrivals of spring lambs) to the May average after they have become more numerous at Louisville. The regular quotations prior to May 1 at Louisville are for limited arrivals of late-born lambs of the previous year's crop. They are less desirable than the fed arrivals at Chicago. The lower Louisville level after July is also arrivals at Chicago. The lower Louisville level after July also is due to poorer quality. This figure also shows the extent of the 1920 drop in price level as compared with 1919.

Price Averages and Variations.

The difference in the price per 100 pounds between lambs, yearlings, and older sheep, both westerns and natives, is shown in Table XXXVIII. Owing to the sharp advance in price which resulted from war conditions, the prices are grouped to show the averages for 1909–1915 and 1916–1919. These annual average prices are shown in the third and seventh lines in the table (reading across the page). The last line of the table shows the percentage of increase of war prices

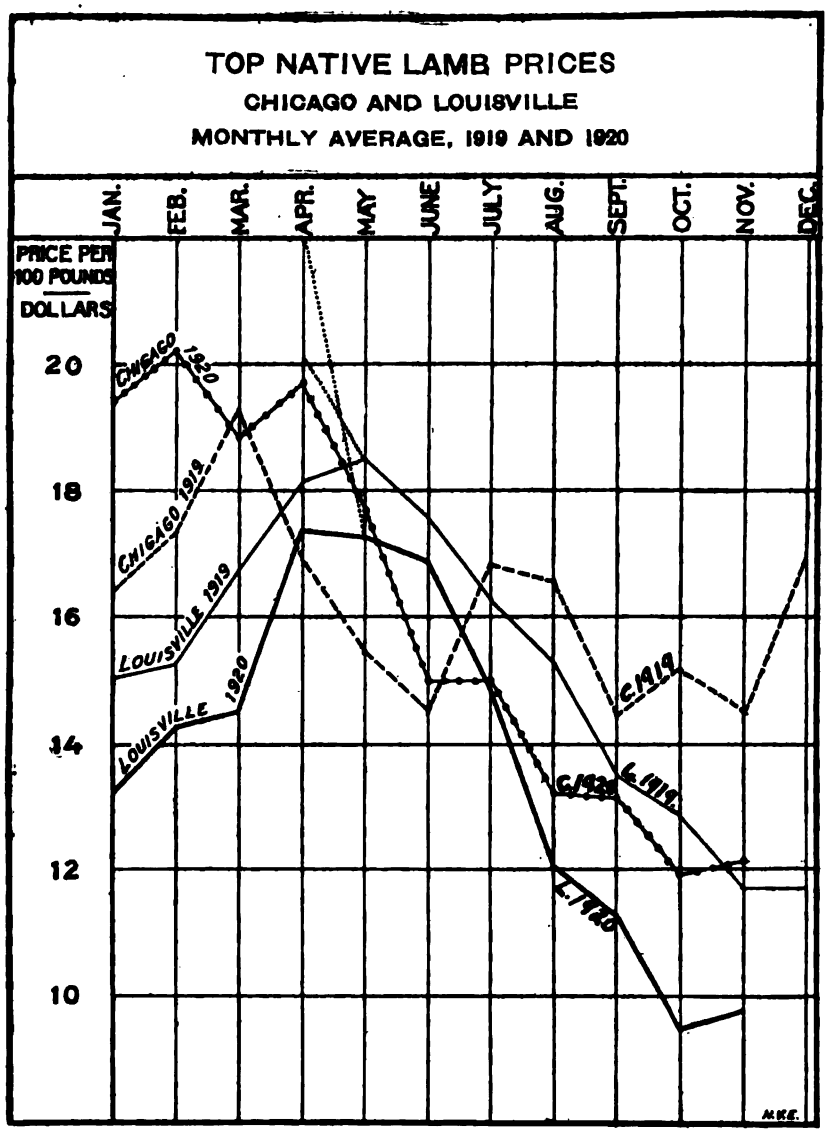

FIG. 6.—Price of top native lambs, Chicago and Louisville, monthly averages, 1919 and 1920.

over prewar prices. Sheep prices rose 104 per cent, yearlings 100 per cent, and lambs 98 per cent.

During the cold season (December to May, inclusive) average prices range higher than from June to November, and yearlings and aged sheep sell closer to lambs. The price level for both sheep and lambs rises in December because of smaller receipts, but the price of desirable older sheep as compared with that of lambs usually rises in November owing to a perceptible though only temporary lowering in the quality of lambs during the late fall. This is more marked in December, but by January 1 the converging of prices from this particular cause is corrected. After January 1, undesirables in all classes are largely eliminated, and the higher relative price of sheep results from the fact that during the cold season heavier cuts move more freely in the consuming markets. Then, too, a large number (about 20 per cent) of the fed lambs which reach the market during the winter have been finished to too great a weight and have to sell considerably closer to yearling prices than lighter but equally well-finished lambs. Lamb prices average higher during the winter months, however, than in the summer because of smaller receipts and higher quality. Lines 1, 2, 5, and 6 in Table XXXVIII show the average seasonal price differences by classes and subclasses of sheep and lambs.[6] It will be noted that western sheep and lambs always outsell natives by a small amount. This does not mean that a prime

[6] It will be noted that in the prewar period yearlings averaged $1.02 higher than sheep (or 20 per cent), lambs $1.37 above yearlings (22.3 per cent), and $2.39 higher than sheep (46.8 per cent). During the war period yearlings averaged $1.87 above sheep (18 per cent), lambs $2.55 higher than yearlings (21 per cent), and $4.42 above sheep (42.4 per cent). The slight narrowing of the percentage of spread between the prices of lambs and of older animals was due to a more limited supply of the latter, for which there always is a good demand up to a certain point. This would seem to indicate that except in abnormal seasons, such as the latter part of 1920, the market for mutton appears to be sufficiently strong to maintain about the present percentage of difference in price. It might seem that the demand for breeding ewes during the war period was the main cause for the narrower percentage difference in average price of sheep and lambs. But there was as great a gain in sheep prices relative to lamb prices during the winter season as during the summer season, and it is during midsummer and early fall that any pronounced demand for breeding ewes would affect prices. Only in 1917 does the price curve for sheep show a marked rise during this time of year. There is almost always a slight rise during November and December. For percentage differences in price of sheep, yearlings, and lambs, winter and summer, the following tabulation is presented:

Seasonal difference in price of lambs relative to yearlings and sheep.

	Winter.		Summer.	
	Lambs above yearlings by—	Lambs above sheep by—	Lambs above yearlings by—	Lambs above sheep by—
	Per cent.	*Per cent.*	*Per cent.*	*Per cent.*
1909–1915	17.1	38.5	28.2	56.6
1916–1919	14.5	34.4	28.1	52.1
Gain in relative price	[a] 2.6	[b] 4.1	[a] .1	[b] 4.5

[a] Yearlings. [b] Sheep.

western lamb is superior to a prime native, but, as previously suggested, results from the higher average quality of the western animals.[7]

TABLE XXXVIII.—*Price of native and western sheep, yearlings and lambs, Chicago, 1909–1915 and 1916–1919.*

	Sheep.		Average for sheep.	Yearlings.	Lambs.		Average for lambs.
	Native.	Western.			Native.	Western.	
December-May, 1909-1915	$5.45	$5.70	$5.58	$6.60	$7.55	$7.91	$7.75
May-November, 1909-1915	4.52	4.76	4.64	5.67	7.11	7.42	7.27
Annual average	4.99	5.23	5.11	6.13	7.33	7.67	7.50
December-May, 1916-1919	11.01	11.26	11.14	13.09	14.63	15.31	14.97
May-November, 1916-1919	9.44	9.93	9.68	11.49	14.53	14.90	14.72
Average	10.23	10.60	10.42	12.29	14.58	15.10	14.84
Per cent increase in annual average price, 1916-1919 over 1909-1915	105	103	104	100	99	97	98

The average monthly price of native and western sheep and lambs at Chicago for the years 1909 to 1915 and 1916 to 1919 is presented in Figure 7 (page 290). This figure visualizes the average rise in price which has occurred as well as the monthly variation. The only point in this graph which calls for comment is the accentuation of the drop in June prices during the war period. June arrivals at Chicago are mainly lambs and sheep which have been wintered and shorn before sale for slaughter. The bulk is usually heavier than desired for the June market. This would depress the price in any case, and the removal of the fleece accentuates the drop in price. Because the price of wool rose relatively more than the price of sheep and lambs, a larger percentage of the June arrivals was shorn during the war years. This, of course, exaggerated the drop in June prices still more, owing to the enhanced value of the fleece. The slight rise during the month of August in the price of native and western sheep during the war years as against the absence of such rise in average prices prior to 1916 resulted largely from a greater demand for breeding ewes during the period of high prices. In contrast to this slight rise, there was a pronounced increase in the prices of sheep during the winter months.

[7] The true effect of the price cut on culls is not shown in these averages, which are based on bulk sales. For instance, on September 29, 1919, choice to prime native lambs sold at $14.25 to $15, westerns at $14.75 to $15.50, and native culls at $7 to $9. Yearlings, all grades, sold at $8 to $11, wethers at $8 to $9.25, and cull wethers at $4 to $7.50. On September 27, 1920, choice to prime native lambs sold at $12.50 to $13, westerns at $13.50 to $13.75, and native culls at $8.50 to $9. Yearlings, all grades, sold at $7 to $10.25, wethers at $7.25 to $7.75, and cull wethers at $3.50 to $4.50.

The use of monthly average prices for a series of years, as in Figure 7, always results in a smoother and more regular curve than one which charts monthly changes for any one year. Figure 8 is therefore presented to show how markedly supply and demand can affect monthly variations in prices. Average monthly prices, which of

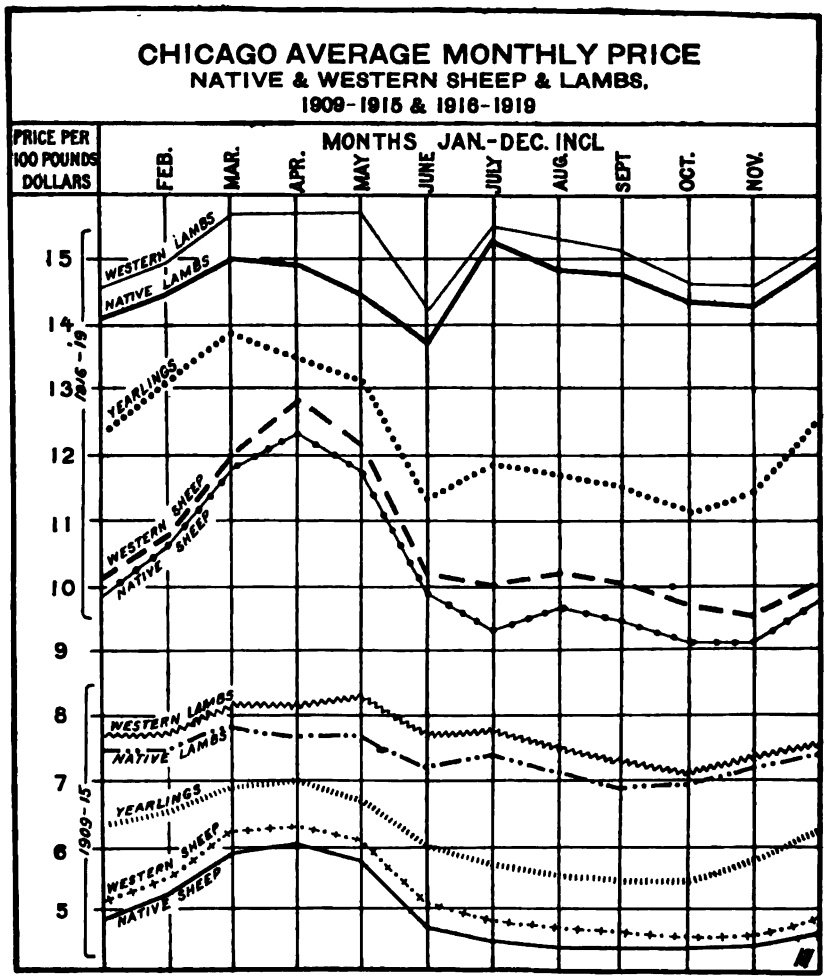

FIG. 7.—Average monthly prices, Chicago, native and western sheep and lambs (1909–1915 and 1916–1919.)

course do not show daily and weekly variations, are charted for certain years for their suggestive value. The resulting curves can readily be explained by changes in supply and demand, which, in turn, are affected by many factors in addition to receipts and slaughterings at any given time. The unusual decline shown in the fall of 1919, although aggravated by the thin condition of the

western lambs caused by the drought, was largely the result of an abnormal proportion of native culls. It will be seen that the largest

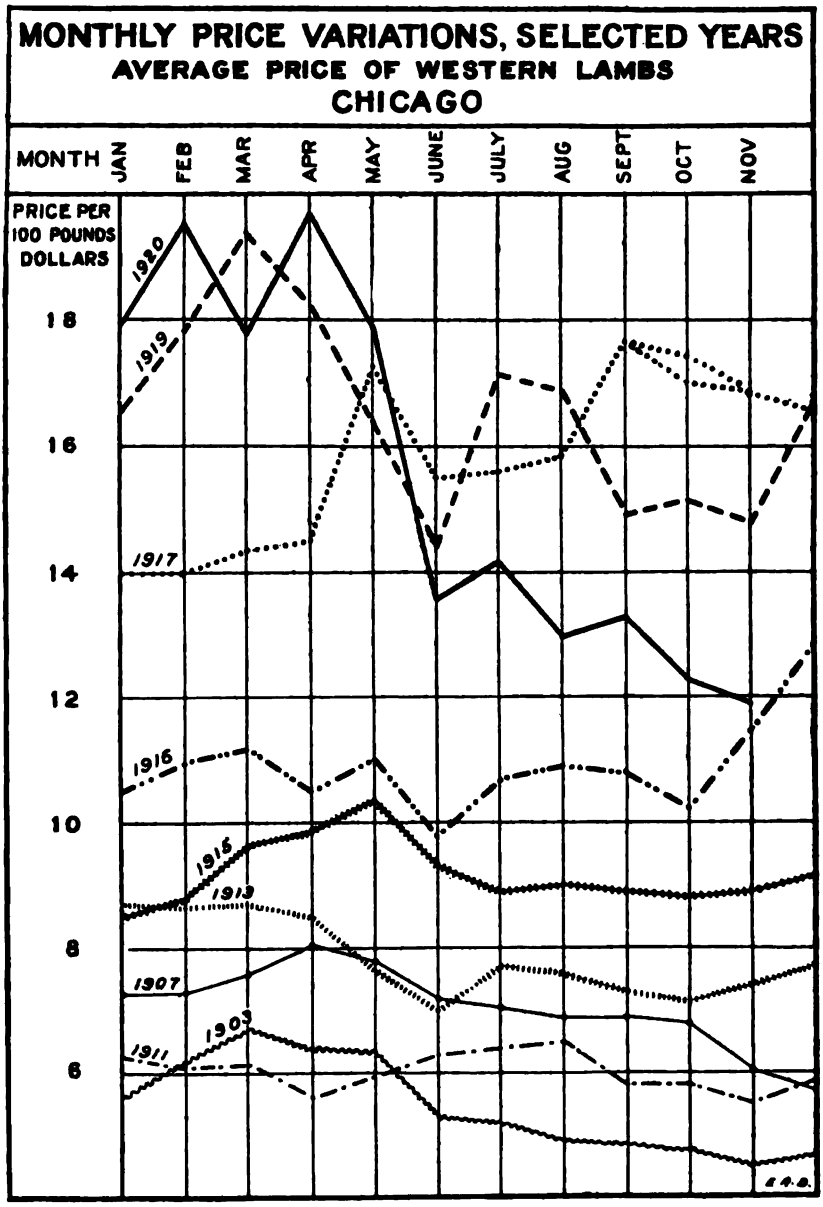

FIG. 8.—Monthly price variations, selected years; average price of western lambs, Chicago.

gain from a prewar to a war level was between October, 1916, and January, 1917.

Weight as a Factor in Price.

The effect of variations in weight on the price of lambs has already been suggested. Provided they have finish, weight has much less effect on the price of yearlings and aged sheep. Late in May and early in June early lambs, which scale close to 65 pounds, are most in demand, because light cuts are desired during the hot weather. As the season advances the acceptable weights get heavier. During August and September the lambs often weigh 80 to 85 pounds per head in car lots, and some go as high as 90 pounds, but these are generally discriminated against in favor of lighter, well-finished animals. Prices for different weights vary with the supply of animals of those weights at the time. When the arrivals consist largely of heavy lambs, and there is a marked scarcity of lighter lambs, animals of medium weight and finish may sell at as much per 100 pounds as those which are heavy, fat, and decidedly superior. When the arrivals run strongly toward lighter weights, with a marked scarcity of those between 80 and 90 pounds, the lambs of medium weight and finish always sell below superior, heavier animals. Those which weigh close to 90 pounds then often bring as much per 100 pounds as those which carry a very good finish, but which weigh 5 to 10 pounds less. There has never been a time, however, when a lamb of medium weight and finish has brought as much as a fat, well-finished lamb of the same weight, for the reason that the fatter the lamb the higher the dressing percentage (dressed weight vs. light weight) and the more valuable the carcass on the hook in the cooling room.

Pelt Wool as a Factor in Price.

In connection with market prices for sheep and lambs it should be noted that the wool carried by unshorn animals has an important bearing on live-weight values. This has been especially true during the recent years of high wool prices, when the wool on the pelt was valued as high, or higher, per pound as the dressed carcass. From 1912 to 1914, inclusive, data gathered for one day each week from the Chicago market show that from the latter part of March to about the middle of May shorn fed lambs sold for 12.6 per cent less per 100 pounds than unshorn lambs on the basis of practically "top" prices.[8] When prices for lambs in only fair to top condition were used, the shorn animals sold at 13.1 per cent less than the unshorn "fair" to "top" lambs. This resulted from the fact that large numbers of animals were finished only to fair to good market condition with the idea of making a satisfactory profit from their heavy fleeces. Their lower dressing percentage relative to strictly prime lots resulted in a larger average cut in price when shorn. For the same

[8] Prices used to derive these percentages were those at which most of the highest quality sold, but not the price paid for occasional very exceptional lots of unusual excellence.

period each year from 1915 to 1919, inclusive, the price of shorn tops was 16.8 per cent below the unshorn, and on fair to tops 17.4 per cent lower. This was caused by the increase in wool prices during the latter period. That is, the above percentages of the live-weight price paid for unshorn lambs was due to the wool they carried, the short lengths on the pelt, i. e., the "shearling" wool of the pulleries, being disregarded as worth little more than cost of removal. These details are shown by years in the following table:

TABLE XXXIX.—*Price per 100 pounds, shorn and unshorn lambs.*

Year.	Fed lambs, native and western tops.				Fed lambs, fair to tops.			
	Wooled.	Shorn.	Difference.	Per cent difference.	Wooled.	Shorn.	Difference.	Per cent difference.
1912-1914	$8.67	$7.58	$1.09	12.6	$8.33	$7.24	$1.09	13.1
1915-1919	15.92	13.22	2.70	16.8	15.37	12.70	2.67	17.4
1920	19.97	17.34	2.63	13.2	19.50	16.62	2.88	14.2

In the spring of 1920 the difference in price between shorn and unshorn lambs fell almost to the prewar percentage as a result of the slow market for medium and low wools. It fell below the prewar level after the middle of May. In September of 1920 the effect of the moribund skin and wool market was such that lambs selling on the Chicago market at $13.50 per 100 pounds were equivalent to animals selling at $17.96[9] in September, 1919. The cut in price of live animals per 100 pounds due to change in pelt values was $3.50, and on offal and increased labor cost the cut was $1.

Imports of Frozen Lamb and Mutton.

In 1920 the domestic market was greatly affected by shipments of frozen lamb and mutton from Australasia and Argentina. They came mainly from Australasia and were shipped to the United States by the British Government. Up to December 2, a total of 2,662,000 carcasses had been received since April, and there were enough on the way to make a total approximating 3,000,000. These imports will make a total of over 106,000,000 pounds. This is between one-fifth and one-fourth of the normal amount of lamb and mutton slaughtered under Government inspection in the United States. Of the total amount imported to December 2, about one-half was held in storage on that date. These arrivals operated all summer to weaken the sheep market, already depressed by the collapse of the market for wool. Arrivals from south of the equator after September 1 were particularly unfortunate for American shepherds because they greatly exaggerated the effect of the autumn glut. Their need for

[9] Breeders' Gazette, Sept. 2, 1920, p. 399, and American Sheep Breeder and Wool Grower, Sept., 1920, p. 684.

a strong market was never more pressing than in the fall of 1920, because of the absence of a market for the 1920 wool clip. A glance back to Figures 6 and 8 will show how the price of choice to fancy native lambs (Fig. 6), and the average price of western lambs (Fig. 8) on the Chicago market was depressed after the wool market broke about June 1 and imports of frozen lamb and mutton arrived to compete with the domestic product.

There is no certainty as to the amount of future importations from Australasia, but at the present time the British Government has large supplies of frozen lamb and mutton on hand which their markets can not immediately absorb. The cold-storage plants of the United Kingdom, Australia, and New Zealand are overcrowded. It is generally believed that after a period of readjustment, which may take a year or more, this supply of imported frozen mutton need not be feared. However, it is worthy of note that the Canterbury Sheep-owners' Union has issued a statement expressing satisfaction at the reception given to New Zealand lamb by this country, and has stated that there seems to be practically an unlimited and lucrative market in this country for their product. The Union apparently is of the opinion that the United States market can absorb 2,000,000 lamb and mutton carcasses annually. Should their expectations be realized, the marketing problems confronting the American shepherds will be more difficult of solution.

CONCLUSION.

American shepherds greatly desire and need more stable market prices. The close relation between market receipts and prices, particularly the effect of the glut during the fall months, and of the quality of a large part of the native receipts during the autumn congestion, has been shown. It is evident that the problem of securing a better distribution of sheep and lambs throughout the year, and of a betterment in quality particularly, is of great importance. As the congestion comes at about the time when the grazing season closes, it probably never can be wholly avoided, even if that were desired. It can, however, be considerably relieved. In the first place, two-thirds of the lambs from Middle Western States are marketed between September 1 and December 1. Then, too, prices for all lambs are depressed by the very large percentage of inferior to cull native animals. Because of the acceptability of thin western lambs for fattening purposes, and the good prices paid for them, a major factor in depressing autumn prices is the flood of mediocre natives. This can be corrected by better attention to breeding and to minor details of care and feed which can be readily given by any attentive grower. At the same time, many more of the shepherds could well afford to have their lambs come earlier. By a little

more attention, care in feeding, particularly by the use of special forage crops for ewes and lambs, and grain for the lambs in creeps, they could put their lambs on the market from four to eight weeks earlier. They would then benefit by the higher prices for spring lambs during spring and midsummer. Unless the demand for these lambs became stronger, earlier marketing by too many of the shepherds would result in all early lamb growers getting somewhat lower prices, but it is most improbable that enough would find it practicable to affect very appreciably the normal May-August price premium. However, proper docking and castrating, and minor betterments of feed and care, particularly with the use of a small patch of rape or other green forage crop for use after the pastures get dry in midsummer, would have a marked effect on prices through the elimination of cull lambs without the more detailed care necessary for early or midsummer marketing. Both fleece States and range shepherds would then benefit considerably. Growers whose lambs were yet too thin to command a good price would generally find it profitable to put them on a fattening ration for a short time, and market them in December or January, after the glut had passed.

The western growers can also help to relieve the congestion. Probably more of them who have plenty of winter feed could, by erecting lambing sheds, have their lambs come earlier and get them on the earlier market, though the additional cost should be carefully considered. Some of the sheepmen, living on ranges where there is a milder climate, could market their lambs profitably during July and August at about 4½ months of age, whereas they now have a tendency to overstay the market and ship their product when 6 to 7 months old. The lambs arrive during the period of heaviest receipts and come in direct competition with those from the more northern ranges. It also seems possible that more of the southwestern ewes might be bred early, to raise their lambs on alfalfa pastures during the winter, and in favorable years to supplement this by use of feed on the desert ranges. Such lambs would be ready for the period of low receipts and high prices during April and May.

While it is probable that the greater number of range men can not get their lambs ready to avoid the glut period, they could help by sorting their sheep more carefully and shipping only the fat ones, holding back a little longer the thin lambs, which should be sold as feeders. The market would be strengthened if a considerable portion of the stockers and feeders could be held until the demand is stronger, and especially if they could go direct to the feed yards. As shown in Figures 1 to 3, the stocker and feeder sheep and lambs reach the yards during the period of congestion, and as they are available to the packers as well as to sheep feeders, they help in depressing the market. In most range areas, however, crop and field refuse is already

used for such purpose, and an extension of this practice is conditioned primarily on more complete use of existing forage supplies. On the other hand, if the recent increase in freight rates remains in effect, a much larger percentage of the feeder animals will move direct from range points to the feed yards. Past increases have operated to increase direct shipments to save local freight rates from markets to feed yards and return. This is indicated by the larger proportion of direct purchase during the last few years as against some years ago (30 to 40 per cent against 20 to 25 per cent).

The spreading of the market season for western lambs and the holding back of the feeders would also help considerably in solving the shipping problem. By prolonging the shipping season the railroads would be relieved of a part of their peak load and be able to give better service. One of the reasons for an insufficient supply of equipment for shipping sheep results from the use of special double-deck cars. Many of these are in use for only a short season, and must remain idle the rest of the year. The lengthening of the period in which these cars are in use would be equivalent to an increase in number.

The packers could also help absorb the heavy autumn receipts by freezing a larger percentage of the inferior lambs.[10] Should the producers modify prevailing management and marketing methods to a considerable extent, there would be less need for such packer action, but there always will be something of a glut during the fall of the year. Prejudice on the part of consumers against frozen meats has discouraged extensive freezing of the seasonal surplus, but the American experience with imported frozen carcasses during the past summer, and further experience this winter in view of the existing heavy holdings of frozen Australasian lamb and mutton in this country, would suggest that the consumers' attitude is subject to change. In this connection, however, it should be noted that the imported frozen meat must always sell below that which is chilled save with dishonest retailers and inexperienced buyers. The origin of the product is really immaterial. It may be that in the long run the imports of frozen lamb and mutton may prove a benefit to the domestic producer

[10] The average amount of frozen lambs and mutton in store each month, as reported to the Bureau of Markets, U. S. Department of Agriculture, for 1916 to 1919, and the amount of domestic lamb and mutton frozen down each month in 1910, are shown in thousands of pounds in the following tabulation:

	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
Average in storage, 1916-1919	7,515	7,214	6,657	5,515	4,799	4,403	4,007	4,106	4,178	4,735	6,049	7,212
Monthly freezings, 1919	1,736	1,265	1,351	1,531	1,271	998	981	931	1,804	1,793	2,546	1,457

through their effect in stimulating the use of frozen meats.[11] In this country there has been a disposition in some quarters to prevent the packers from freezing down any great quantity on the ground that it would enable them to manipulate the markets. As a matter of fact, such storage, properly regulated, if need be, should help equalize market prices as between producer and consumer, as well as stabilize prices somewhat over periods of time, by preventing a part of the September-November price slump and spreading it over a larger part of the year. Subsequent marketings of fed sheep and lambs would not be greatly affected as chilled meats will always command a premium over frozen meats.

Another problem in connection with the future welfare of the sheep industry, particularly in the range States, is that of increasing the consumption of lamb and mutton in this country, though not necessarily at the expense of beef and pork. In the words of the president of the National Wool Growers' Association: "Wool is a natural necessity, but wool can not continue to be produced unless we have a large market for our lamb product." The annual per capita consumption of mutton and lamb in the United States is 6.1 pounds as compared with 81.4 pounds of beef and 98.4 pounds of pork (including lard).[12] Comparing the amount of lamb and mutton consumed with the total consumption of meats and lard among those countries for which data are available the United States stands lowest with 3.3 per cent. Great Britain leads with a mutton consumption equal to 21.8 per cent of the total meats and lard, France second with 11.4 per cent, and Canada third with 6.6 per cent. In view of the large production of beef and pork at a reasonable price because of the heavy corn crop grown in the United States, there would be small reason to expect this country to consume lamb to the exclusion of other meats. Because of the existing concentration on lamb consumption, however, it seems probable that an appreciable and worthwhile increase in the consumption of lamb can occur without unduly affecting other meats, and with but small effect on the per capita consumption of all meats.

At the present time three-fourths of the mutton eaten in the United States is consumed north of the Potomac River and east of the Allegheny Mountains. New York, Philadelphia, and Boston are the big centers of consumption, and the principal demand is in the various cities. Very little mutton is consumed in the Southern or Western States, where there is a prejudice of long standing against it. On the other hand, California is one of the heaviest mutton-consuming States. It is claimed that the city of Los Angeles uses 4,500 to

[11] It is worthy of note in this connection that in 1919, 43 per cent of Great Britain's mutton supply consisted of frozen carcasses from Australasia and South America.

[12] Monthly Crop Reporter, March, 1920, p. 27.

5,000 lamb carcasses weekly, while San Francisco consumes a total of 6,000 carcasses each week. To offset this condition of low mutton consumption, campaigns have been inaugurated by the National Wool Growers' Association, some of the State agricultural colleges, and by the packers to increase the mutton consumption. It is estimated that as a result of this campaign the per capita consumption of mutton was increased nearly one-half pound in 1919. It is believed that the consumption can be considerably increased without materially affecting the consumption of other meats.

It seems quite possible that efforts to increase consumption could be considerably aided by a modification in the procedure of packers. Much of the endeavor has been to popularize the cheaper cuts—those taken from the carcass in front of the heart girth—which normally move slowly and at a relatively low price. The difficulty in disposing of the cheaper cuts has much to do with existing reluctance on the part of many retailers to handle them, and the high percentage of bone is a disadvantage from the standpoint of many consumers. There seems to be no reason why the packers themselves should not bone a part of these cheap cuts. It would be extremely difficult, if not quite impracticable, for them to handle all or perhaps a major portion in that manner, but a limited force steadily employed could handle a considerable amount. The obvious convenience to the consumer in securing boned, rolled pieces of any size desired, with no bone and entire absence of waste, should greatly stimulate sales. The price, of course, would be higher, but should not entirely offset the saving in waste. Also by removing from cuts of mutton the "fell" membrane,[13] which causes the strong, muttony flavor, a step would be taken toward removal of existing prejudices against the flesh of aged sheep. Persistence in such a procedure by the packers on a fairly comprehensive though not necessarily a very ambitious scale, with cooperation on the part of some retail butchers, might result in such a demand for boned prices that the retailers as a whole would be forced to handle mutton and lamb in that form even if they did not do the boning themselves. A steady supply of cuts prepared in so convenient a form could easily have a far-reaching effect on consumption.[14]

Aside from the complication which results from the importation of frozen carcasses from abroad, the problem confronting domestic sheep and wool growers in securing more stability in market prices consists of (1) smoothing out the supply curve, (2) increasing consumption, and (3) eliminating mediocre and cull animals in the

[13] The thin membrane which incloses the outside of the carcass after the pelt has been removed.

[14] It appears from recent advices that one of the packers has lately adopted this practice with excellent results.

market receipts. Improvement along any of these lines would be of benefit. More extensive freezing of the domestic products, contingent on development of a broader outlet for the frozen meat, is perhaps of equal importance with the above. Pronounced decrease in receipts of medium and cull animals is very necessary and undoubtedly is the most important. It rests entirely with the shepherds of the fleece-wool States. An attempt to increase the consumption of lamb and mutton seems now to be showing results. The question of irregularities in supply is primarily one for attack by the producers. Attempts on the part of disinterested agencies to secure a more even distribution of receipts throughout the week and from week to week have not proved entirely satisfactory.[15] Stability of market prices will react greatly to the benefit of all growers of sheep and wool and will greatly assist the western sheepmen in adapting themselves to the era of high operating expenses resulting from heavy land investment and higher labor, feed, and other costs. Such stability, therefore, would help put the wool-growing industry on a firm basis and would enable this country more nearly to supply its needs for wool.

[15] The zone system, as used by the Bureau of Markets to regulate shipments, in order to spread out the heavy arrivals from two or three days to four or five days during the week at the different markets. This system was carried on by the railroads during the early part of 1920 but has since been almost entirely abandoned. The packers are now endeavoring to attain the same end through exchange of information with the shippers.

PART III.

WOOL GROWING IN FOREIGN COUNTRIES.

CHAPTER 13.

WOOL GROWING IN AUSTRALIA.

SUMMARY.

The Commonwealth of Australia is almost exactly the size of Continental United States, but has a much larger area of pastoral territory. Only the southeastern portion of the country is well adapted to intensive agricultural pursuits. Between this fertile district and the desert in the central and western portions are great plains rich in grasses but deficient in rainfall. Most of the sheep and cattle are raised in this area, but the number has not been increasing during the last quarter of a century, and it is possible that the present situation may be maintained with slow, or perhaps no, further development for an indefinite time.

Twenty-five years ago there were about 100,000,000 sheep in the Commonwealth, but to-day there are probably less than 80,000,000. The production of wool decreased in like proportion from about 720,000,000 pounds in 1909 to about 548,000,000 pounds in 1916–17, but rose again to 732,000,000 in 1919–20. Contrasted with this tendency in the sheep industry, it is found that the production of agricultural crops, such as wheat, oats, and barley, has steadily increased. The output of wheat was about 10,000,000 bushels in 1860 and almost 180,000,000 bushels in 1915. The acreage under agricultural crops has increased from a little over a million acres in 1860 to nearly 19,000,000 acres in 1915. These facts would suggest that pastoral development may have reached its zenith, and may even show a gradual decline in the face of intensive agriculture.

Because of the character of the country, however, farm crops will never displace the pastoral industry in Australia to the same extent that they have displaced it in the United States and Argentina. The

extent to which the country is still in the pastoral stage of development is indicated by the land situation. Out of a total area for the Commonwealth of about 2,000,000,000 acres, only a little more than 100,000,000 acres were privately owned in 1917; something less than 870,000,000 acres were leased or licensed; and, roughly, 875,000,000 acres were unclaimed and unused Crown land. If water were available these figures would indicate great possibilities of development for the pastoral and other agricultural industries, but most of the unclaimed regions are deserts, with a rainfall insufficient to provide irrigation water.

As might be expected from the character of the country, the average size of the flock is relatively large as compared with that in the United States. There were about 20 flocks in the Commonwealth in 1919 containing more than 100,000 head, and perhaps 50 per cent of the sheep were in flocks of over 10,000 head.

The herding system is not practiced in Australia in the same sense that it is in the United States. The range is fenced into paddocks containing two to four thousand acres each, and the sheep are shifted from one paddock to another on the large holding as necessity requires. In the fertile coastal regions large numbers of sheep are raised in connection with mixed farming operations, and the method of flock management is similar to that of mixed ranching in the United States.

The predominant type of sheep in Australia is the Merino, of which there are at least three general varieties suited to the different range conditions of the country. The finest wool type weighs, on the average, about 80 pounds and ranges on the high uplands in the temperate zone, where the grasses are short but strong. The medium wool type weighs about 110 pounds and will bear rougher treatment than the fine wool. The strong wool type, weighing about 150 pounds, is especially adapted to the great semidesert regions where harsh grass and salt bush are the chief feed.

Mutton and lambs are chiefly a by-product of wool growing. A good crossbred type, in which the production of meat is about as important as wool, is being developed in the mixed farming district, although it is not characteristic of the pastoral area.

It should not be inferred, however, that the Australian mutton supply is a negligible quantity in world markets because, as a matter of fact, the sheep industry is so enormous that even these by-products assume large proportions and amount to hundreds of millions of pounds in world trade. Over 200,000,000 pounds were exported from the Commonwealth during the season 1913–14, and immense stores that have piled up because of shipping difficulties will be released in the near future.

One of the peculiar problems of Australia, and one which entails a large annual expense, is that of pests. Rabbits, blowflies, wild dogs, and prickly pears cause a large annual damage, either by reducing the carrying capacity of the range or by a reduction in the wool clip through a loss both in the actual number of sheep and in the pounds of wool per head. A constant warfare, both public and private, is maintained against these pests, but they are only measurably held in check and show no signs of being exterminated.

The outstanding features of wool marketing in Australia are the careful preparation of the fleece by skirting, classing, and pressing at the shearing sheds, and the regular auctions in the great wool centers. For these auctions reliable classified catalogues, made up from samples of each grower's clip, are used, and expert buyers from all over the world are able to bid quickly and certainly with the aid of the catalogues.

During the war the entire Australian clip was taken over by the British Government at a flat rate of about 31 cents per pound. The whole scheme was administered by the Central Wool Committee, with many semiofficial assistants, who carried on the whole transaction of grading, storing, shipping, and paying for the wool. The imperial contract expired on June 30, 1920.

The prices under Government control have not been as high as for similar wool in the United States. The average rate since 1916 of 31 cents per pound is considerably under the range of 40 to 60 cents to American growers since that date. There will be an additional dividend due the growers out of the profits from the sale of the wool by the British Government. Final figures are not available, but the dividend is estimated at 15 to 18 per cent of sales during the period of control, provided the cost price may be realized on the Government wool now in storage.

The whole Australian sheep-raising industry was so much affected by the war that it will require some years for conditions to become normal. The indications are that, although there may be a considerable increase in the output of wool and mutton from the Commonwealth in the future, yet such increase is more likely to come through the development of small holdings and diversified agriculture and an increase in the number of crossbred sheep rather than by any great expansion of the purely pastoral phases of the industry.

CLIMATE AND PHYSICAL FEATURES.

The Commonwealth of Australia, including Tasmania, is almost exactly the size of the United States exclusive of Alaska. The area of the former is 2,974,581 square miles and that of the latter is 2,973,890 square miles. Australia has an area nearly three-fourths

as great as Europe or about 25 times that of Great Britain and Ireland. The length from east to west is, approximately, 2,500 miles, and from north to south from 1,500 to 2,000 miles. This continent lies in the Southern Hemisphere and therefore has seasons reversed from our own, a fact that is of some importance in international trade. About 40 per cent of the area is in the Tropical Zone and 60 per cent in the South Temperate Zone. The climate therefore varies from warm to hot, and in most of the territory severe winters are unknown.

The chief physical characteristics of the Commonwealth are as follows: From the extreme northeast around the bend of the continent to the south runs a narrow band of coastal plain less than 100 miles wide, which is fertile, well watered, and therefore highly productive. Tropical vegetation predominates in the northern portion of this belt, and Temperate Zone products thrive in the southern part.

Rising sharply from this plain is a mountain system nearly a thousand miles long and on the average about 5,000 feet high, though it rises to a height of 7,500 feet in some places.

Back of this range, and extending to the northwest for about a thousand miles, is a great interior basin of rolling plains somewhat like the great prairies of our Middle West. This is the heart of the pastoral region, where millions of sheep and cattle are grazed. North of this region—the northeastern portion of the continent—are the low, hot areas of the tropics. West of this basin and merging into it by slow degrees is the great interior desert of central and western Australia. For another thousand miles this relatively high and dry plateau reaches westward and has scant vegetation and usually less than 10 inches of annual rainfall. Some portions of it are suitable for grazing but much of it is a sandy waste. Toward the west this plateau rises into a still higher plain, three to four thousand feet in altitude, and then dips gradually down to the western border, where a coastal plain is found similar to though much less fertile and less well watered than the eastern plain.

The rainfall for the continent is greatest on the eastern fringe, slightly less over the great plain of the southeast, and still less in the desert a few hundred miles from the coast; it does not increase again until the extreme northern and western borders are reached. More than 37 per cent of the Commonwealth has an average rainfall of less than 10 inches and more than 56 per cent has less than 15 inches.[1] One peculiarity is the fact that in the southern portion of the continent, including the greater part of the fertile plains of the southeast, the rainfall reaches its peak in the winter season—June and July—and shows a gradual decline in the summer season—

[1] Commonwealth Production Statistics, 1917–18.

December and January. In some places in the northern and central portions and extending far down the southern coast, the rains come in the summer, being most abundant in January and February, and register a pronounced decline during the winter months. This summer rainfall is not altogether favorable to agriculture, however, because, (1) in the winter, especially in the north, the temperature is warm enough for vegetation to flourish if sufficient moisture were available, and, (2) evaporation is so rapid in the hot weather that the summer rains are less valuable than an equal precipitation (only 10 to 20 inches usually) would be in the wintertime.

These general statements as to the distribution of rainfall do not tell the whole story, however, because they neglect the fundamental factor of the whole Australian pastoral and agricultural situation; namely, the droughts which sweep the country at not infrequent intervals. Every few years the desert advances, as it were, almost to the foot of the eastern mountains and for a period of one and sometimes two or more years vegetation withers, and live stock must be hurried out of the stricken area or fed at an enormous expense upon feed from other localities. The great drought, culminating in 1902, reduced the number of sheep in the Commonwealth by at least one-third; and if the high figure of 106,000,000 in 1891 is compared with the 53,000,000 sheep remaining in 1903, the reduction was about one-half. In 1902 alone it is estimated that the number of sheep was reduced by approximately 20,000,000.[2]

Another drought prevailed in the latter part of 1918, during the whole of 1919, and through the first quarter of 1920, which promised to be almost as disastrous as the one 18 years ago. Estimates of sheep losses during the last year run as high as 10,000,000 head and reports of the destruction of whole flocks are common. In June, 1920, the drought was broken by general rains throughout the pastoral areas, and fairly good grass and crops seem assured for the present season (1920–21). The menace of drought is alleviated in some localities by irrigation, both by artesian wells and by rivers. In Victoria, for example, water is supplied by this means for 1,000,000 acres of irrigable land and, by furnishing water and some feed for live stock over 6,000,000 acres, which otherwise could not be used, are made available for pasturage.

DEVELOPMENT OF THE SHEEP INDUSTRY IN AUSTRALIA.

Sheep raising has been one of the most important industries in Australia for the past hundred years, and the wool output of the Commonwealth has been an important factor in the world's markets since 1860. According to figures published in the Official Yearbook of Australia, there are more sheep in that continent than in any other

[2] Report of the U. S. Tariff Board on Schedule K, 1911, Vol. I, p. 493.

country in the world and about 15 per cent of the total number for all countries. Australia had about 85,000,000 sheep in 1917, as compared with 72,000,000 in Russia in 1914, 50,000,000 in the United States in 1919, and 43,000,000 in Argentina in 1914.[3]

A striking feature of the Australian sheep situation, however, is the fact that the number of sheep is not increasing. In fact, there are fewer sheep in the Commonwealth now than there were 30 years ago, as will be seen from the following table.

TABLE XL.—*Production of sheep and wool in Australia.*

(000 omitted.)

Year.	Number of sheep.[a]	Pounds of wool.[b]	Year.	Number of sheep.[a]	Pounds of wool.[b]
1860	20,135	78,486	1912	.....	648,852
1870	41,594	211,414	1913	85,057	711,134
1880	62,176	324,286	1914	78,600	642,735
1890	97,881	.....	1915	69,257	550,605
1900	70,603	409,395	1916	76,669	547,702
1905	74,541	522,062	1917	84,965	573,068
1910	92,047	721,298	1918	87,086	682,190
1911	.....	726,409	1919	87,926	732,222

[a] Official Yearbook of the Commonwealth of Australia, No. 12, p. 293.
[b] Figures given for 1860, 1870, and 1880 are clips for that year, but reported for the year following in "Australasian Sheep and Wool" by Alfred Hawkesworth, p. 465; 1900 and 1905 from Report of Tariff Board on Schedule K; 1910–1919 as reported by Trade Commissioner, A. W. Ferrin.

From this table it is seen that the number of sheep increased in the 30 years from 1860 to 1890 from about 20,000,000 head to nearly 100,000,000, whereas in the next 30 years, 1890 to 1919, the number had fallen to about 88,000,000, and the estimated reduction due to the drought last year has brought the number down to less than 80,000,000.

The decline in the production of wool is not certain, however. In 1910 the output somewhat exceeded 720,000,000 pounds with a decline to about 550,000,000 pounds in 1915, but a recovery is shown after that date, and in the year 1919 more than 730,000,000 pounds were produced—the greatest production in the history of the Commonwealth.

Although the number of sheep seems to be declining, this tendency is not necessarily permanent. It may be that future development will be slow, and it is possible, though by no means certain, that not more than 100,000,000 sheep will ever be run in the Commonwealth under the present pastoral conditions as contrasted with mixed farming conditions. The recent decline probably will be made good in the next few years as the country recovers from the drought and the effects of the Great War and as transportation facilities are improved.

[3] Official Yearbook of the Commonwealth of Australia, No. 12, p. 308.

COMPETITION WITH OTHER INDUSTRIES.

Some indications of the future development of the sheep industry in Australia may be obtained by a comparison of its development with the growth of other agricultural pursuits.

In Table XLI is shown the live stock and wheat production for a number of years; and although these figures are not conclusive, yet the waning of the pastoral industry and the waxing of agriculture are foreshadowed.

TABLE XLI.—*Pastoral and agricultural products.*[a]

(000 omitted.)

Year.	Number of sheep.	Number of cattle.	Number of hogs.	Bushels of wheat.	Acres under all crops.
1860	20,135	3,958	351	10,245	1,188
1865	29,540	3,725	346	9,654	1,586
1870	41,594	4,276	543	12,085	2,186
1875	53,124	6,390	550	18,712	2,567
1880	62,176	7,523	816	23,357	4,578
1885	67,492	7,398	749	27,432	5,307
1890	97,881	10,300	891	27,118	5,430
1895	90,690	11,767	823	18,270	6,451
1900	70,603	8,640	950	48,353	8,812
1905	74,541	8,528	1,015	68,521	9,433
1910	92,047	11,745	1,026	95,112	11,894
1915	69,257	9,931	754	179,066	18,528
1916	76,669	10,468	1,006	152,420	16,806
1917	84,965	11,956	1,169	114,733	14,299
1918 [b]	87,086	12,738	913	75,638	.....

[a] Official Yearbook of the Commonwealth of Australia, No. 12, pp. 293 and 332.
[b] Quarterly Summary of Australian Statistics, June, 1920.

From this table it is seen that the number of cattle and sheep has been relatively constant for the past 30 years. There were about 10,300,000 cattle in the Commonwealth in 1890 and 10,400,000 in 1916. The number of sheep has decreased in the past quarter of a century by about 10,000,000 to 15,000,000 head. Hogs have increased a little since 1890.

Contrasted with the number of live stock produced, chiefly under pastoral conditions, is the production of various agricultural crops. The output of wheat increased from 10,000,000 bushels in 1860 to 27,400,000 in 1885. About 1900 a great increase occurred, and by 1915 the crop was nearly 180,000,000 bushels. A decline set in during the war, and in 1917 the production was about 114,000,000 bushels, about 75,000,000 bushels in 1918, and only 37,500,000 bushels in 1919. This decline is due in part to a reduced acreage caused by war conditions, but in larger measure to the drought of the past two years.

The area under crop is even more enlightening than are the figures for any particular commodity from the point of view of the development of agricultural products as compared with pastoral. Beginning with 1,188,000 acres in 1860, the cultivated areas spread until by 1900 nearly 9,000,000 acres were in crop, and the peak was reached in 1915, when over 18,500,000 acres were under cultivation.

Taken as a whole, this table seems to indicate that the present agricultural development in Australia is somewhat like that of the United States about 40 years ago, when the pastoral industry was at its height and before agriculture had begun to crowd the ranges of our Middle West.

It is not likely, however, that the decline in grazing and the rise of agricultural products will be so rapid in Australia as it has been in the past quarter of a century in the United States. The Commonwealth is still sparsely populated, the whole continent having a population of only about 5,275,000,[4] or approximately 1,000,000 less than New York City; then, too, there is a great difference in the amount of arable land in the United States and Australia; and there is no large immigration. For these reasons the area of intensive agriculture will spread relatively slowly. It is highly probable that for many years to come pastoral products will be the chief commodities of the country.

LAND SITUATION.

Since the introduction of sheep into Australia the country has passed through a variety of changes with respect to the land situation. A century ago great areas were occupied without governmental authority by the process of squatting. Equally large tracts were granted by the Crown and indefinite areas were annexed to these grants by leases for pastoral purposes.

Gradually as population increased a complex system of land laws developed to meet conditions in various localities. Each State has different rules of tenure and settlement, but in general the most important methods of occupation may be summarized as follows:

Conditional purchases.—Considerable areas are taken up each year by purchase from the different States, subject to various conditions regarding improvements and residence which are similar to the stipulations of the homestead laws of the United States.

Leases and licenses.—The amount of land taken up each year by leases or licenses is much larger than by any other method. The leases are drawn in a number of forms, the most important of which are for grazing farms and homesteads, pastoral leases, perpetual leases, and annual occupation leases of Crown lands. The annual fees paid are quite low, but vary considerably in different localities and under different tenures. Perhaps 2 or 3 cents per acre annually is a fair average. All leases, for example, in New South Wales, averaged during the years 1916 and 1917, 2.15 cents per acre for over 117,000,000 acres.

Closer settlement acts.—Another important method of alienating the land in the different States is under the various so-called

[4] Quarterly Summary of Australian Statistics, June, 1920.

closer settlement acts. Under these laws the State is authorized to purchase lands already alienated for the purpose of cutting them up into smaller blocks suitable for settlement according to conditions in the various districts and subject to sale on easy terms to those who will fulfill the obligations of settlers.

Freehold and Leased Areas.

Great areas have been taken up under each form of tenure, but about 50 per cent of the continent is yet unclaimed either by lease or freehold. The total of each class of land, whether privately owned, leased, or Crown land, is shown in the following table:

TABLE XLII.—*Land holdings in Australia.*[a]

(Total area of Commonwealth, 1,903,731,840 acres.)

Year.	Alienated.	In process of alienation.	Leased or licensed.	Held by Crown (unclaimed.
	Acres.	*Acres.*	*Acres.*	*Acres.*
1901	76,142,761	85,060,119	721,407,284	1,071,121,676
1913	103,279,476	52,633,815	862,421,523	885,397,026
1914	104,171,809	54,405,553	873,914,618	871,239,860
1915	105,056,196	56,255,766	880,007,113	853,412,765
1916	105,778,536	56,203,750	881,353,026	860,401,528
1917	106,444,507	55,812,496	868,990,307	872,484,530

[a] Official Yearbook of the Commonwealth of Australia, No. 12, p. 291.

According to this table the land actually owned constitutes a minor proportion of the total area of the country—only about 100,000,000 acres out of a total area of nearly 2,000,000,000 acres. Leased land and "unclaimed Crown" land are about equal in area—something less than 900,000,000 acres in each case. One point of note in regard to these two classes of land is the fact that the leased area decreased about 20,000,000 acres from 1915 to 1917 and that the Crown lands increased by a like sum. This recession of the leased area was probably caused both by drought and war conditions.

Holdings by States.

Further details concerning the occupation of various classes of land in each State and territory are presented in Table XLIII below:

TABLE XLIII.—*Percentage of land holding by States and Territories.*[a]

State or territory.	Total area.	1917.				Sheep per square mile.
		Owned.	In process of alienation.	Leased.	Crown.	
	Square miles.	*Per cent.*	*Per cent.*	*Per cent.*	*Per cent.*	*Number.*
New South Wales	309,460	20.53	10.02	59.20	10.25	1[illegible]
Victoria	87,884	43.43	14.39	22.02	20.16	[illegible]
Queensland	670,500	3.88	2.38	74.80	18.94	[illegible]
South Australia	380,070	4.41	1.28	49.10	5.21	[illegible]
West Australia	975,920	1.32	2.13	30.86	65.69	[illegible]
Northern territory	523,620	0.14	.....	31.07	68.79	[illegible]
Tasmania	26,215	30.73	7.06	10.67	51.54	[illegible]

[a] Official Yearbook of the Commonwealth of Australia, No. 12, pp. 290–295.

This table brings out the fact that New South Wales and Victoria are the heart of the sheep-grazing country of Australia. About 80 per cent of the territory of the former State is occupied and carries an average of 124 sheep to the square mile, and about 65 per cent of the latter State is occupied and carries about 168 sheep to the square mile. These figures are to be compared with those for western Australia, for example, where only about 30 per cent of the country is occupied either by lease or freehold and where the average number of sheep per square mile is about six.

Size of Holdings.

More specific information in regard to land holdings than is given in the foregoing tables is presented in Table XLIV, which shows the number of individual holdings (both freehold and leased) on which sheep were run in 1917–18:

TABLE XLIV.—*The number of each class of individual holdings, 1917-18.*[a]

Size of holdings.[b]	New South Wales (309,460 square miles).	Victoria (87,884 square miles).	Queensland (670,500 square miles).	South Australia (380,070 square miles).	West Australia (975,920 square miles).	Total.[c]
1 to 500 acres	6,778	13,311	244	2,613	708	23,654
500 to 1,000 acres	5,411	6,807	208	2,980	1,096	16,492
1,000 to 5,000 acres	9,329	5,538	523	2,999	2,362	20,751
5,000 to 10,000 acres	1,709	374	254	267	240	2,844
10,000 to 20,000 acres	803	104	333	151	98	1,489
20,000 to 50,000 acres	502	80	348	94	61	1,085
50,000 to 100,000 acres	172	11	158	39	36	416
100,000 acres and upward	197	6	160	83	245	691

[a] Commonwealth Production Statistics, 1918, p. 52.
[b] The holdings classified here are both freehold and leases on which sheep were pastured in the season of 1917-18.
[c] Tasmania and Northern Territory not included in this table.

It is evident from this table that Australia is a country of vast estates. In the districts given here nearly 700 holdings were upward of 100,000 acres each and almost 21,000 were in blocks of 1,000 to 5,000 acres. This latter figure is to be compared with only 23,656 holdings ranging from 1 to 500 acres.

Number of Sheep Per Holding.

The number of sheep carried in 1917–18 for the various classes of holdings, corresponding roughly in size to the classification given in Table XLIV above, were as follows:

TABLE XLV.—*Average number of sheep per holding.*[a]

	New South Wales.	Victoria.	Queensland	South Australia	West Australia.
500 to 1,000 acres	360.9	339.6	346.9	275.9	229.1
1,000 to 5,000 acres	1,124.8	892.2	950.8	626.4	569.7
20,000 to 50,000 acres	10,603.5	8,155.4	8,315.0	6,370.5	3,938.9
50,000 to 100,000 acres	19,238.7	1,638.9	16,226.1	5,169.6	3,598.9
100,000 acres	29,559.5	10,546.5	42,442.0	16,203.0	14,916.1

[a] Commonwealth Production Statistics, 1917-48, p. 52.

New South Wales leads in the number of sheep per holding in every instance except in estates of 100,000 acres and over, in which case Queensland is in the lead with about 42,000 head per holding as compared with 29,500 for New South Wales.

Value of Land.

No general figures for the value of land can be given even for restricted areas because of the many factors which influence prices, but some idea of values may be obtained from the purchase prices of lands which have been taken over by the Government for closer settlement.

TABLE XLVI.—*Lands acquired for closer settlement.*[a]

Year.	New South Wales.			Queensland.		Victoria.	
	Acres.	Value per acre.	Value per acre of adjoining crown lands.	Acres.	Value per acre.	Acres.	Value per acre.
1901	.....	.....	.....	132,760	$12.28	28,553	$25.83
1913	676,439	$19.19	$8.87	664,363	12.55	563,554	37.26
1914	685,156	19.08	8.87	664,363	12.55	567,687	36.20
1915	685,150	19.08	8.87	664,363	12.55	567,993	36.24
1916	745,883	18.73	8.89	785,311	12.13	568,073	36.24
1917	747,204	18.86	8.90	785,311	12.13	571,953	36.39
1918	759,526	18.88	9.01	.....	.....	569,334	36.34

[a] Official Yearbook of the Commonwealth of Australia, No. 12, pp. 260-270.

The valuations given in these tables are probably more accurate for the earlier years than they are for recent periods. Little or no increase is shown since 1913, which would indicate that the valuations are more or less arbitrary and are not typical of conditions as a whole since the war.

Perhaps the table is even more significant for showing the extent of closer settlement than it is for showing land values. Around 700,000 acres in both New South Wales and Queensland and over 550,000 acres in Victoria have been taken over by the Government each year since 1912 and made available for settlement to small holders. The total area acquired under the closer settlement acts for the Commonwealth as a whole down to June 30, 1918, was 3,471,795 acres.

Land Rents.

From the point of view of the pastoral industry the land rentals are perhaps more important than their capital value because a large portion of the grazing area is held under lease rather than in fee simple. (See Table XLII.) The acreage and approximate rent per acre in the leasing sheep-raising sections are as follows:

TABLE XLVII.—*Land rent, Jan. 30, 1918.*[a]

State.	Area leased (acres).	Average rent.
New South Wales	116,159,073	$0.0219 per acre.
Victoria	12,383,810	Grazing leases, 2-4-6 cents; perpetual leases, 4 per cent of unoccupied value.
Queensland	394,548 square miles, or 252,510,720 acres.	$4.43054 per square mile, or $0.00692 per acre.

[a] Official Yearbook of the Commonwealth of Australia, No. 12, pp. 254–255.

One important point to be considered in connection with the rentals of pastoral leases is the fact that they run for a long term of years—usually 14 to 28 years—without revaluation, and are therefore not subject to the constant fluctuations in rents which a system of short-term private leases would entail. As a result of this practice rentals have been little affected by war conditions over much of the continent. Whether these low rentals encourage the expansion of the sheep industry during periods of high prices, however, is largely a question of the alternate use of the land. If the land proves more profitable for cattle raising or for farm crops, sheep raising will decrease regardless of the low rentals. In the main, however, other industries do not thrive in the sheep districts because of the unfertile soil and scant annual rainfall; therefore, the low rents encourage the spread of sheep raising.

The whole development of Australian land settlement since 1901 may be summarized as follows: The alienated land increased from over 75,000,000 acres in 1901 to more than 100,000,000 acres in 1917. These figures represent about 4 and 5½ per cent, respectively, of the area of the Commonwealth. About 720,000,000 acres, or 37 per cent, were under lease in 1901, and 868,000,000 acres, or 46 per cent of the total area, were under lease in 1917. Contrasted with these figures are those for Crown lands and unoccupied territory, amounting to more than 1,000,000,000 acres, or 56 per cent of the area of the continent, in 1901, and about 872,000,000 acres, or 45 per cent of the area in 1916.[5]

The size of the various holdings is equally interesting. Only about 2,500,000 acres are in farms of less than 100 acres. About 20,000,000 acres are in farms of 500 to 1,000 acres, 42,000,000 acres are in blocks of 1,000 to 5,000 acres, and 10,333,000 acres are held (1916–17) in blocks of 20,000 to 50,000 acres. About 85 holdings include over 50,000 acres each.[6]

In short, Australia has vast areas of land available for settlement, much of which is suitable for agriculture and a much larger portion that is fitted for grazing. In addition to this there are great stretches

[5] Official Yearbook of the Commonwealth of Australia, No. 12, p. 291.
[6] Ibid., No. 11, p. 299.

of desert now worthless, and which probably will remain so for an indefinite time. Expressed in round figures, only 5 per cent of the continent is permanently alienated, 3 per cent is in process of alienation, 45 per cent is under lease, usually in tracts of thousands of acres, and 45 per cent is still owned by the Crown or is unoccupied and unclaimed.

FLOCK MANAGEMENT.

The outstanding features of sheep husbandry in Australia are (1) the size and character of the flocks; (2) the paddock or fencing system as contrasted with the herding system in the United States; (3) the organized fight against pests, such as rabbits and blowflies; and (4) the absence of severe winters, which renders winter feeding unnecessary.

As might be expected from the character of the country, the flocks are relatively large in size as compared with those in the United States. There were 18 flocks in the Commonwealth in 1919 containing more than 100,000 sheep each, 90 flocks of 50,000 to 100,000 head, and 456 flocks with between 20,000 and 50,000. About 50 per cent of the sheep in the Commonwealth run in flocks of over 10,000 head; the average size of all herds including the smaller ones is about 1,200 sheep. Excluding owners whose flocks are less than 500 head, the average size of the remainder runs about 3,000 head.

These figures for the Commonwealth as a whole are valuable for presenting a general view of the industry with respect to the size of the flocks, but more specific information will give a truer picture of the situation. In Queensland, for example, the majority of the stations range from 10,000 to 60,000 acres in size and carry from 2,000 to 15,000 sheep. There are also a number of large holdings carrying over 100,000. In 1916, the Government intelligence service for Queensland reported typical large stations as follows: Wellshot, 141,174 head; Terrick Terrick, 140,307; Milo, 136,951; and so on through a list of 20 or more stations running over 80,000 sheep. These figures refer to stations only and not to sheep companies. Some companies own a number of stations. One man named is interested in 26 stations running about 400,000 sheep; another company has about 500,000 head; and companies with many stations are common.

To present the character of the industry still more concretely, life at a typical station may be sketched somewhat as follows:

A large establishment in Queensland resembles a small township. The homestead consists of a large well-built house surrounded by a cluster of other structures, some quite large though less substantial than the main building. The largest of them is likely to be the

woolshed, containing 30 to 40 shearing stands and surrounded by numerous pens and paddocks for manipulating the flocks. In addition to these, there are offices, storerooms, cottages for the permanent force, and less substantial quarters for the shearing crew. Usually the grounds are well laid out and planted with trees, shrubs, and flowers, and the whole establishment equipped with running water and electric or gas lights. In short, the station is almost a self-sustaining community.

The sheep range, adjoining the homestead, extends several miles across the rolling hills, but no herding is done in the sense that a herder stays with the band throughout the season. On the contrary, each station is cut up into a number of paddocks or pastures of 2,000 to 4,000 acres each, and the sheep are shifted from one paddock to another as the grass and water supply dictates. A number of men are kept busy, however, riding the boundary fences, watching the water supply, and inspecting pastures, and during the busy seasons of lambing, shearing, and dipping an additional force is employed.

In dry seasons, or when large sales of sheep are to be made, the flocks are shifted in large bands by the drovers from one holding to another, or to market, as the case may be. These drives often cover hundreds of miles, the sheep living off the country as they drift slowly on their way.

In addition to these large stations, there is a growing number of small grazing homesteads, running from 4,000 to 5,000 sheep on about 20,000 acres of leased land, operated by a man and his family with the regular assistance of one hired man and the temporary assistance of several others during the shearing and lambing seasons.

Another kind of sheep husbandry is that practiced in the fertile coastal region by those engaged in mixed farming. These farmers own from 640 to 2,560 acres of land carrying from 100 to 1,000 sheep. Small-grain, maize, and forage crops are raised for the sheep and other live stock. In some cases, in the dry districts back from the coast, the crops are raised by irrigation, and the whole establishment is run much like the mixed ranches of Colorado or Idaho. A further distinction between the mixed-farming area and the grazing district is the fact that on the small farms crossbred sheep are run to a considerable extent, or if Merinos are kept, they are more nearly pure-bred stud stock than those run in the "back country."

Character of the Flock.

The predominant type of sheep in all the pastoral regions of Australia is Merino, though other varieties are found in various localities, according to climate and topographical conditions. Briefly

stated, there are three main types of Merinos in the Commonwealth—(1) the fine-wool breed, which fares best on the high lands within the temperate coastal zone where short, sweet grasses grow; (2) the medium-wool type, which can bear rougher treatment; and (3) the strong wool variety, which is a sheep of large frame and tough constitution adapted to the great interior plains where the heat is oppressive in summer and where feed consists chiefly of dry, harsh grasses, and salt bush. The average weight of the three classes of ewes in the order named is 80, 110, and 150 pounds.[7]

In addition to these three types of Merinos, a growing number of crossbred sheep are found in the Commonwealth. The Lincoln-Merino and Leicester-Merino crosses are much in favor for a combination wool and mutton type, and especially for a good market lamb. Shropshire and Southdown are also used to cross with Merinos.[8]

As the country has become more thickly settled and as mixed farming has spread, the crossbreds have gained in importance. During the war the demand for crossbred wool for making khaki caused it to increase greatly in price as compared with Merino wool, and this increase was immediately reflected in the types of sheep bred in Australia. Merinos still constitute nearly 70 per cent of the total number of sheep, but that they have declined relatively is shown by the following table:

TABLE XLVIII.—*Percentage of merino and crossbred wool grown in Australia.*

Description.	1915-16[a]	1916-17[a]	1917-18[a]	1918-19[b]
	Per cent.	*Per cent.*	*Per cent.*	*Per cent.*
Merino	78.42	74.86	73.21	68.28
Crossbred	21.58	25.14	26.79	31.72

[a] Official Yearbooks of the Commonwealth of Australia, Nos. 11 and 12.
[b] Dalgety's Annual Wool Review (1918–19).

Mutton and Lambs.

The foregoing discussion of the different types of sheep has indicated that the production of mutton and lambs is a secondary though an increasing factor in the Australian sheep industry. Wool is still the main product of the flock, however, and over large portions of the pastoral area only the surplus stock is marketed for meat. Although the frozen meat trade is growing, the fact that most of the carcasses are Merino rather than heavy crossbreds indicates that mutton is still a by-product. This statement should be modified to some extent in the mixed farming area, where both crossbreds

[7] Report of U. S. Tariff Board on Schedule K, 1911, Vol. I, p. 463.
[8] Official Yearbook of the Commonwealth of Australia, No. 11, p. 318.

and heavy Merinos are developed largely to cater to the mutton market.

The late war has given the mutton and lamb movement a setback in the past few years, however. The number of sheep slaughtered, including lambs, fell from 14,700,000 in 1913 to 8,900,000 in 1917. There would have been a more serious decrease in the number of sheep slaughtered if the British Government had not bought and stored large quantities of mutton and if there had not been a large increase in local consumption. No statistics are available for the local consumption of mutton and lambs, but the change in the export trade is indicated by the following table:

TABLE XLIX.—*Australian frozen mutton and lamb exports to the United Kingdom and other countries.*[a]

Season taken as from July 1 to June 30.	United Kingdom.		Other countries.	
	Mutton.	Lamb.	Mutton.	Lamb.
	Carcasses.	*Carcasses.*	*Carcasses.*	*Carcasses.*
1911-12	1,909,068	1,450,651	167,120	26,430
1912-13	2,091,582	1,188,370	166,474	27,313
1913-14	2,698,654	1,741,897	224,283	33,529
1914-15	2,931,703	1,867,513	91,725	806
1915-16	555,051	409,441	20,814	10,750
1916-17	922,441	572,691	15,785	8,025
1917-18	177,797	161,917	320	.....
1918-19	1,033,561	116,012	.....	.....

[a] The Pastoral Review, Sept. 16, 1919, pp. 842 and 845.

This decline in the exports of mutton and lambs from about 5,000,000 carcasses in 1914 to about 350,000 in 1917 is obviously a temporary matter, and a great revival of the trade may be expected in the immediate future.

The exports of mutton and lambs from Australia to the United States[9] have never been large and it may be expected that with the resumption of normal trade the United Kingdom will continue to take most of the frozen meats from that continent.

Expenses of Running Sheep.

Detailed cost statements of running sheep in Australia are not available, but considerable information has been obtained in regard

[9] The imports of mutton and lambs into the United States from Australia for recent years were as follows (U. S. Commerce and Navigation Reports):

	Pounds.		Pounds.
1912	2,051	1916	60
1913	571,008	1917	--------
1914	3,291,471	1918	--------
1915	524,210	1919	66,893

to rates of wages and other items of expense at the present time as compared with 1911. These items are listed in the following table:

TABLE L.—*Comparative expenses of running sheep.*

Item.	1911 [a]	1919 [b]	Queensland, 1918. [c]
Shearing	$5.34 per 100 sheep	$7.30 per 100 sheep	$7.30 per 100 sheep.
Shed hands			$14.60 per week and keep.
Scourers			Do.
Cooks		$500 per year and keep	$11.68 per week and keep.
Station hands			Do.
Boundary riders	$6.07 per week and keep	$12 per week	$9.73 per week and keep, or $13.39 without keep.
Mechanics	$7–$9 per week and keep	$17 per week and keep	
Musterers	$5–$7 per week	$9.75–$10 per week	
Board	$3.50 per week per man	$4.85 per week per man	
Managers	$2,000–$3,000 per year	$2,000–$3,000 per year	
Overseers		$1,200–$1,400 per year	
Fencing	$121.66 per mile	$243.32 per mile	$145.99 per mile.
Dipping	$0.02 per head	$0.02 per head	

[a] Report of U. S. Tariff Board on Schedule K, 1911, Vol. I, pp. 481–487.
[b] Special reports by the United States Department of Commerce
[c] Australian Sheep and Wool Industry, the Government Intelligence and Tourist Bureau, 1918

No attempt is made to interpret these figures in terms of running expenses per head of sheep or per pound of wool because only a small part of the total expense involved in operating a station is listed here. However, in view of the fact that rents for pasture lands are quite low and that little, if any, winter feeding is necessary for the range stock it is safe to say that Australia is, and probably will remain for some time to come, one of the great low-cost areas of the world with respect to wool and mutton.

PESTS.

The chief pests that affect the sheep industry in Australia are rabbits, blowflies, wild dogs, and the prickly pear. The increase of rabbits is one of the serious public and private problems of the continent, and will probably remain so for a long time to come. It was recently stated by the Sydney Morning Herald that rabbits had reduced the sheep-growing capacity of New South Wales by 20,000,000 head, while the damage in Victoria is estimated to be millions of dollars annually. So plentiful have the rabbits become that their slaughter for meat and skins is a thriving industry. Exports of rabbit meat have grown from about 9,300,000 pair in 1913 to over 14,000,000 pair in 1918. The export of skins was about 90,000 hundredweight in 1913 and a little over 70,000 hundredweight in 1918.

Rabbit catchers are regularly employed by sheepmen at wages of $15 per week in addition to their right to the rabbits they catch. Fencing is, however, the chief mode of dealing with them. Up to June 30, 1919, New South Wales alone had built 1,332 miles of rabbit-proof fence, costing about $340,000, and private firms had put up over

100,000 miles of netting at a cost of about $30,000,000. Victoria has, perhaps, even more rabbit fencing than New South Wales.

The expense of this sort of fencing, as compared with ordinary fencing, is shown by the fact that under present conditions the former costs about $300 per mile and the latter less than $150 per mile.

The loss of sheep in New South Wales from the wild dog or "dingo" is estimated at about $6,300,000 annually. Dog-proof fences have been built along the Queensland border for a distance of about 200 miles at a cost of about $50,000, and the State of New South Wales is preparing to build about 150 miles of dog fencing at a cost of about $240,000.

The prickly pear is another pest that is spreading over a great area of sheep pasture. It is confined chiefly to Queensland, where, according to the latest estimates, it has ruined about 22,000,000 acres of native land. Men are employed regularly at high wages to dig out the prickly pear.

The blowfly or sheep maggot, which must be combated regularly to prevent serious infection, is another source of considerable loss. A report from the infected districts of western Queensland in 1913 states that, out of 1,000,000 sheep examined, about 23 per cent were found to be infected; in some flocks the infection ran as high as 70 per cent.[10] Recently these flies have not been so plentiful on account of the drought, and over large portions of the pastoral area they have caused little trouble as compared with earlier years. The pest is now being combated by parasites, and it is estimated by some authorities that it can be controlled within 18 months and extirpated within five years. These predictions, however, are based upon local experiments rather than upon large-scale field work and are probably too optimistic.[11] The most common method of combating the fly is by dipping, and although the expense is not great, constant vigilance is required to prevent serious losses.

MARKETING.[12]

The process of marketing wool in Australia begins in the shearing shed. From the moment the fleece leaves the shearer's hands great care is exercised to keep it in the best marketable condition.

From the shearing platform the fleece is spread on tables and skirted; that is, the tags and the inferior wool, including the neck, are taken off, and the remainder is passed on to the classer. Here the fleece is unrolled, and after examination is carefully rerolled and

[10] Sheep Maggot Fly Pest, Queensland Department of Agriculture and Stock, 1913.

[11] Dalgety's Annual Wool Review for Australia, season 1918–19, pp. 44–45.

[12] The account of the prewar mechanism of the Australian wool market is based upon the discussion of the subject in The Founding of the Wool Industry in Australia, by Charles T. Burfitt, 1913, pp. 70–80.

thrown into the various grading bins, such as "super," "firsts," "seconds," and "clothing." The various grades next go to the press, where they are made into bales of about 325 pounds each and carefully wrapped. The kind, grade, and the owner's name or station are then stenciled on each bale, so that buyers in remote parts of the world know whose wool they are getting—a practice of great advantage to growers of high-quality wool.

The clip is usually consigned to brokerage firms in the great auction centers rather than sold outright to local dealers. These brokerage houses have representatives out among the growers early in the year, and often considerable advances of funds are made on the wool long before shearing time, the clip itself being pledged as security.

From the shearing sheds the wool is transported to the railroad—often a considerable distance—and thence shipped to such markets as Brisbane, Sydney, Adelaide, and Melbourne. At these places the wool is stored, each clip separately, in the sheds of various wool merchants (some 10 or 12 large firms in Sydney, for example), and store slips or warehouse receipts are forwarded to the owner as soon as possible after weighing.

About one bale out of five from each clip is taken to the show floor, usually a well-lighted space on the top floor of the shed. A catalogue is made up containing the names of the owners of the various clips, the grade of wool, and other necessary details, and each buyer is furnished with a copy of the document. On sale days, as soon as it is light, expert buyers from all over the world begin their examination of each sample on the floor and insert their maximum price in the catalogue opposite each lot in which they are interested. The auctioneer is also furnished with the owner's refusal price, and at 3 o'clock on each sale day (daily in Sydney during the season, and Mondays, Wednesdays, and Fridays in Melbourne, and at various intervals at other wool centers in the Commonwealth), the auction begins at the wool exchange of the city. So rapid is the work that, in the busy season, from 600 to 800 lots pass under the hammer in a single afternoon. The day after the sale, invoices are sent to the buyers, who usually are allowed 14 days to settle with the broker, but the growers generally receive payment from the brokers within 7 to 10 days after the sale.

The bulk of the Australian clip is marketed in this manner in normal times, but some of the large growers, whose names and quality of wool are well known, consign their clip directly to the London market. The returns are slow in coming, however—usually six to eight weeks—and therefore this method is not in favor with most producers.

During the war the system of marketing was radically changed, although the physical mechanism of packing and storing the wool was little affected except by the warehouse congestion due to a lack of shipping.

In November, 1916, the British Imperial Government purchased the entire wool clip, less 516,000 bales which had been sold at public auction before the arrangement was effected. Similar arrangements were made for the acquisition of the 1917–18 clip and, subsequently, the Imperial Government decided to extend the purchase of Australian wool for the period of the war and for one year after. The imperial contract came to an end June 30, 1920, and the trade has gone back to the old system of auctions.

The terms of the imperial contract stipulated that the British Government should take all the wool at the flat price of 15½d. per pound (about 31½ cents) in the grease, this being the average price for the previous season, plus 50 per cent. Wool brought into the stores was appraised by representatives of the Central Wool Committee, a semigovernment body, and each grower's clip was valued, not at 31½ cents per pound, but at such a value, according to quality, as would bring the average value of wool for the whole Commonwealth up to the flat purchase price of 31½ cents per pound. The wool was then sent to London as fast as shipping was available, and was either used by the British Government or resold in British and foreign markets.[13]

The final figures for the profits to the British Government during the control period are not yet available, largely because much of the wool has not yet been sold. Taking the wool at the cost price—about 31 cents per pound—the profits are estimated at something over $300,000,000 for the whole period of control.[14]

If the cost price of the wool is actually realized in future sales, which seems doubtful under present conditions, the Australian growers' share of the profits will be roughly $150,000,000, or about 18 per cent of their sales—that is to say, they will ultimately realize about 37 cents per pound for their wool during the period of control.

In May, 1920, a referendum was taken upon the proposal to continue the imperial control of wool after June 30, 1920, but the plan was defeated by a narrow margin and auction sales were resumed in October under certain restrictions with respect to the disposal of the wool owned by the British Government.[15]

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[13] See Chap. 3, "Wool Control During the War," pp. 61 ff.

[14] London Morning Post, Dec. 15, 1920, quoted by U. S. Consul Hamilton C. Claborne, London, England.

[15] Special report on The Sheep Industry, May 10, 1920, by A. W. Ferrin, American trade commissioner, Melbourne, Australia.

MARKET PRICES.

Prices of Wool.

Inasmuch as the prices of Australian wool and mutton have been fixed under the terms of the imperial contract, it is sufficient here to give a summary of such prices for the past few years.

TABLE LI.—*Local prices of Australian Merino wool.*[a]

Year ending June 30—	Greasy (average quality), average price per pound.	Superior greasy, highest price per pound.	Year ending June 30—	Greasy (average quality), average price per pound.	Superior greasy, highest price per pound.
1901	$0.15	$0.24	1911	$0.21	$0.37
1902	.18	.27	1912	.20	.37
1903	.22	.35	1913	.23	.39
1904	.21	.32	1914	.24	.41
1905	.22	.36	1915	.21	.38
1906	.24	.35	1916	.31	.50
1907	.24	.37	1917	.31	.50
1908	.21	.41	1918	.31	.50
1909	.19	.38	1919	.31	.50
1910	.22	.42	1920	.31	50

[a] Report on The Sheep Industry in Australia by A. W. Ferrin, American trade commissioner, Melbourne, Australia, March, 1920, p. 8

In this table the first column of prices represents the average price for all wool for the years indicated. The second column represents the highest price for special grades. A few especially fine clips have brought even higher prices than those listed in the table. The record appraisements for fine Merino during the control period seem to have been 63 cents greasy and 97 cents scoured. The low price for very inferior Merino has been 26 cents. Comebacks and fine crossbreds have been appraised as high as 57 cents greasy, and low-grade crossbreds at 20 cents and under. It is not possible to obtain a sufficient table of qualities and prices to make an accurate average for either crossbreds or Merinos, owing to the fact that all people connected with the wool industry are under pledge to the Central Wool Committee not to divulge the facts. It is probable, however, that 46 cents per pound is somewhere near the average for Merino during the control period.[16]

The first sale of wool by auction in Australia since November 22, 1916, was held in Adelaide, South Australia, on October 1, 1920, and was followed by an auction in Sydney on October 6.

At Adelaide about 22,000 bales, all Merino, were offered. A satisfactory demand was shown for sound and well-grown wools of good length. Inferior wool was not in demand, and about 14,000 bales were withdrawn. One lot of 20 bales, superfine hogget, brought 80 cents per pound, said to be the highest price ever realized at an Australian public auction. Similar wool of a grade not quite so

[16] Report on The Sheep Industry in Australia, by A. W. Ferrin, American trade commissioner, Melbourne, Australia, March, 1920, p. 8.

high brought 68, 63, and 60 cents. For the best fine wools prices were 50 per cent above appraisement prices; for good 64s from 25 to 30 per cent above, and ordinary 64s, 10 per cent.

At the Sydney auction on October 6–8, the highest price obtained was 68 cents per pound for a small lot of superfine Merino. Both Merino and crossbred wools were offered. The wools were drawn mainly from the west and northwestern districts and, it is said, showed signs of the recent drought, being fine and chalky and not up to the usual standard. The bidding for the finer wools is said to have been chiefly between Australian and French buyers. Super wools ruled 35 per cent above appraisement prices; good wools. 20 to 25 per cent above; and medium wools, from par to 10 per cent. The general trend of prices for good to medium Merinos and fine crossbreds was declared to be satisfactory. There was practically no sale of inferior wools.[17]

On December 6 sales were held at Perth, West Australia, with poor results. Fifty-four thousand bales were offered, but only 4,000 bales were sold, all of which were super Merino.[18] The sales at Melbourne on December 7 were more encouraging, especially for the fine grades of wool. Dalgety & Co., for example, offered 3,400 bales, of which 2,080 were sold.[19] Super Merino showed but a small loss over previous sales and a decided increase over the Government appraisement price during the war. Typical clips were sold as follows:

	Sale price (greasy), per pound.	Appraised price last year, per pound.
	Cents.	*Cents.*
Glenetine	80	58
Burrabogey	56	40
Hartwood (Merino)	44	49
Hartwood (Comeback)	25	40

The premium on super Merino and the discount on coarse wool as compared with the appraisement price last year are strikingly brought out in these quotations. Although these prices are high, especially for fine wool, the markets are very irregular, and buyers show little interest in them.

Prices of Mutton and Lambs.

During the war all the exportable meat of Australia was acquired by the Commonwealth Government for the account of the Imperial Government. Fixed prices[20] for mutton and lambs were as follows:

Ordinary mutton	10.5 cents per pound.
"Two-tooth" mutton	11.0 cents per pound.
Lamb	12.5 cents per pound.

[17] Commerce Reports, Nov. 20, 1920.
[18] Daily News Record, "Wool Market," Dec. 10, 1920.
[19] The Wool Record and Textile World, Dec. 9, 1920, p. 1679.
[20] Report by A. W. Ferrin on The Sheep Industry in Australia, p. 28.

These prices are for frozen carcasses and therefore do not represent the true prices for stock on the hoof. The trend of the sheep and lamb market is indicated by the following quotations in Melbourne for March 30, 1920:[21]

TABLE LII.—*Prices of sheep, Melbourne, March 30, 1920.*

Kind of sheep.	Price per 100 pounds.
Prime crossbred wethers	$8.25 to $9.72
Good crossbred wethers	$6.31 to $8.01.
Inferior crossbred wethers	$3.39 up.
Prime crossbred ewes	$6.55 to $8.01.
Good crossbred ewes	$5.10 to $[illegible].31.
Inferior crossbred ewes	$1.93 to $2.91.

The prices are considerably under the ruling prices for similar stock in the United States on the same date. Recent prices in this country were little, if any, above these quotations. Current Australian prices are not available, but they seem not to be sufficiently lower than the prices in this country to encourage importation of frozen mutton and lambs.

DISTRIBUTION OF AUSTRALIAN WOOL.

About 95 per cent of the Australian wool clip is exported. In normal times nearly 38 per cent of it went directly to the United Kingdom, a little less than 60 per cent to continental Europe. and 2 or 3 per cent to the United States. During the war, however, conditions were greatly changed because of the imperial purchase, and between 70 and 80 per cent of the clip went directly to the United Kingdom, only about 10 per cent to the Continent, and 10 to 15 per cent to the United States. More detailed figures and percentages are given in the following table:

TABLE LIII.—*Distribution of Australian wool exports.*[a]

Exported to—	1912		1913		1914-15		1915-16	
	Pounds.	Per cent.	Pounds.	Per cent.	Pounds.	Per cent.	Pounds.	Per cent.
United Kingdom	267, 997, 266	39.16	237, 740, 058	36.00	415, 958, 336	72.48	277, 523, 835	48.60
France	181, 631, 156	26.54	197, 391, 625	29.89	17, 096, 413	2.98	16, 127, 694	2.83
Germany	128, 606, 707	18.79	114, 340, 607	17.32	6, 532, 099	1.14	.....	.....
United States [b]	8, 785, 823	1.28	14, 915, 153	2.26	70, 847, 111	12.35	170, 979, 896	29.94
Belgium	66, 001, 925	9.64	62, 421, 540	9.45	4, 825, 868	.84	.....	.....
Italy	5, 618, 097	.83	6, 155, 020	.93	19, 502, 378	3.40	53, 008, 291	9.28
Japan	14, 841, 045	2.17	14, 328, 537	2.17	34, 932, 485	6.09	49, 725, 005	8.71
Other	10, 858, 911	1.59	13, 044, 510	1.98	4, 137, 722	.72	3, 660, 352	.64
Total	684, 340, 930	100.00	660, 337, 050	100.00	573, 852, 412	100.00	571, 025, 068	100.00

[a] Official Yearbooks of the Commonwealth of Australia, Nos. 11 and 12.
[21] Report by A. W. Ferrin on The Sheep Industry in Australia, p. 30.

TABLE LIII.—*Distribution of Australian wool exports*—Continued.

Exported to—	1916-17		1917-18		1918-19 [b]	
	Pounds.	Per cent.	Pounds.	Per cent.	Pounds.	Per cent.
United Kingdom	377,280,975	83.36	257,608,185	68.03	558,723,351	82.56
France	14,287,007	3.16	5,799,873	1.53	3,794,019	.56
Germany	308,344	.07	.....	.....	.....	.....
United States [c]	16,174	.....	60,318,219	15.93	74,696,922	11.04
Belgium	.....	.....	.....	.....	.....	.....
Italy	30,912,007	6.83	18,593,813	4.90	10,106,800	1.49
Japan	27,002,093	5.96	12,477,639	3.29	12,615,227	1.87
Other	2,789,850	.62	23,878,308	6.32	16,769,385	2.48
Total	452,596,450	100.00	378,676,037	100.00	676,705,704	100.00

[b] Dalgety Annual Wool Review, 1918-19.
[c] Imports of wool from Australia to the United States for the year ending June 30, 1920, were 46,920,259 pounds. Imports since June were negligible—40 pounds in July and 412,432 in November. (U. S. Commerce and Navigation Reports.)

In addition to these exports, approximately 5 per cent of the wool is consumed locally in woolen and tweed mills or by the top makers. Although this percentage is quite small, the wool production of the Commonwealth is so large that the absolute figures for home consumption of raw wool are important. In 1912, the wool used locally amounted to something over 10,000,000 pounds. By 1915 the amount had almost exactly doubled, and in the season 1919-20 it was something over 29,000,000 pounds. Of this amount 18,432,024 pounds were used in the woolen mills and over 10,600,000 pounds by manufacturers of tops.[22] More detailed information in regard to the development of the wool-working industry in Australia is contained in the following table:

TABLE LIV.—*Wool-working industries in Australia, 1912-1917.*[a]

Item.	Fell mongering and wool scouring.		Woolen and tweed mills.	
	1912	1917	1912	1917
Number of factories	120	98	32	27
Number of employees	2,544	2,599	3,379	3,755
Actual horsepower of engines used	3,831	4,157	3,692	6,853
Approximate value of land and buildings	$267,188	$276,162	$307,049	$342,491
Approximate value of plant and machinery	348,970	369,728	497,827	571,637
Total amount of wages paid	299,352	332,583	232,561	352,640
Value of fuel used	31,445	53,667	22,709	44,063
Value of raw materials worked up	3,859,200	7,341,638	468,728	1,076,641
Value of final output	4,444,938	8,572,579	930,485	1,948,151
Value added in process of manufacture	585,738	1,230,941	461,757	871,510

[a] Official Yearbook of the Commonwealth of Australia, No. 12, pp. 507-524.

From this table it will be seen that the wool-working industries of Australia made little, if any, progress during the war. The number of establishments, both of woolen mills and scouring works de-

[22] Report of Central Wool Committee, season 1919-20, p. 33.

creased in the five years from 1912 to 1917, the former from 32 to 27 mills and the latter from 120 to 98 establishments. The number of mills, however, increased slightly in both cases. The value of raw material and of output showed great increases, but these were due largely to increased prices of products rather than to an increased quantity of production.

In addition to these establishments, there were several mills making wool tops. One company alone has a capacity of about 6,000,000 pounds of tops per annum—about three times the capacity of all other top makers combined—but this capacity was never reached during the war. Recent figures for the exports of tops run from 4,500,000 to 5,000,000 pounds annually since 1914.

Although these figures for the wool-working industries in the Commonwealth are not large as compared with the industry in the United States or Great Britain, yet the plans for the future are ambitious. The more optimistic authorities believe that within 10 or 15 years home manufacturers will take care of at least one-third of the Australian wool clip, and they have gone so far as to make detailed estimates of the capital investment, the additional labor, and other items, necessary to carry out their plans. A movement is now on foot to raise the necessary capital by the sale of stock shares among the wool-growers of the country.

In furtherance of the plan for the development of the domestic woolen industry a protective tariff has been placed upon wool products. Some details of the duties are shown in the following table:

TABLE LV.—*Australian tariff rates on woolen fabrics.*[a]

Products.	General tariff.		British preferential
	Rate up to Mar. 24, 1920.	Rate on and after Mar. 25, 1920.	
Woolen piece goods ..... per cent..	35	45	30
Women's coats	$1.22	$1.56	$0.84
Costumes	$1.80	$2.43	$1.22
Wearing apparel, n. e. i. ..... per cent..	45	55	40
Woolen yarns ..... do....	.....	10	Free.
Woolen yarns, after 1923 ..... do....	.....	20	10

[a] Report by A. W. Ferrin on The Sheep Industry in Australia.

There may be some doubt as to the period of time necessary to develop a home industry in Australia that will consume a considerable portion of domestic wool, but, as the country develops, a much larger proportion of the home demand for wool products will be supplied by domestic manufacturers.

Current Conditions.

The conditions of the Australian wool industry as of January 1, 1921, may be briefly summarized as follows:

Wool auctions have been resumed, but the market is dull and irregular. Fine wools are scarce and bring very high prices, but crossbreds rarely receive a bid. At recent auctions prices ranged anywhere from 80 cents a pound for super Merino down to 25 cents per pound for comebacks.

The stocks on hand of the old wool owned by the British Government are estimated roughly at 1,800,000 bales, or something less than 600,000,000 pounds. In addition to this the clip for 1920–21 is largely unsold. There is a scarcity of the best grades of wool in this clip, and the total of all grades is about 1,600,000 bales, as compared with a normal clip of roughly 2,000,000 bales.

From these figures it will be seen that there are almost two clips of Australian wool in the world to-day where normally there would be but one. The final disposition of these stores is not certain, but a movement is on foot to market them gradually through a holding or controlling company of Australian producers and dealers.

Chapter 14.

WOOL GROWING IN BRITISH SOUTH AFRICA.

SUMMARY.

The Union of South Africa has an area of nearly 475,000 square miles, which is somewhat less than the combined area of the Rocky Mountain States of this country, and like these States, the territory is primarily a grazing country rather than agricultural. The mountains along the southeast coast interrupt the prevailing summer winds from the Indian Ocean with the result that Natal and parts of the Transvaal and the Cape Province have a heavy rainfall and a subtropical climate. Farther inland, on the high table-lands of Orange Free State and the Transvaal, the rains come only in summer, and although sufficiently plentiful at that time for rich pasturage, the whole district is barren and dry for several months during the winter. Still farther inland beyond the mountains, in the high valley of the Orange River, semidesert conditions prevail. The rainfall is only 10 or 15 inches and comes chiefly in the summer in dashing showers which soon run off the bare plains and leave the country as dry as before. In parts of the territory, especially in the southern portion of the Cape Province, although the rainfall is uncertain, considerable forage is furnished live stock by the Karroo bush which grows in the desert much like the sagebrush of our own western ranges.

The outstanding feature of the land situation in the Union is that practically all the good land has been taken by settlers years ago. Of the 475,000,000 acres in the Union only about 45,000,000 are Crown land, and this is barren and infertile. About 200,000,000 acres are privately owned and of this amount about 13,000,000 acres, or 6 per cent, are in the cultivated area but only about half of it, or 3 per cent of the freehold land, was in agricultural crops in 1919. Testimony before the Dominions Royal Commission indicates that probably never more than 5 per cent can be profitably cultivated even under irrigation. The carrying capacity of the best range land is about one sheep per acre, of average range about one sheep to 4 acres, and of the worst land now used for pastoral pursuits, about one sheep to 10 acres.

The sheep industry of the Union is as old as the European settlements themselves. Little progress was made, however, in the 150 years prior to 1850, largely because of the continual migration inland of the Boer farmers. In three different 5-year periods, since 1850, however, the wool production of the Union has doubled and perhaps the greatest development has occurred since 1904. In that year there were roughly 12,000,000 wooled sheep in the Union and by 1912 there were over 27,000,000. The maximum was reached in 1913 when there were 28,300,000 sheep in the territory. Since that date there has been a gradual decline down to 23,500,000 in 1919.

These numbers place South Africa beside New Zealand and England as a sheep country. The Union is probably far from overstocked with sheep, however. It is probably that with the spread of irrigation to furnish water and winter feed, the Union can carry double the present number of live stock. Little competition is to be expected from cattle except to a slight extent in the dairying industry. The number of cattle has remained practically constant since 1911, and the number of goats and ostriches has decreased. Dairy products have more than doubled since 1914; the increase is from 11,300,000 pounds in that year to over 26,000,000 pounds in 1918. Maize or Indian corn increased from 30,000,000 bushels in 1914 to over 45,000,000 bushels in 1918. These increases, however, are probably not significant from the point of view of competition with the sheep industry.

Prior to the war South Africa imported practically all her basic foodstuffs. Only wool, angora hair, ostrich feathers, and maize were agricultural exports, and all other products, including beef and mutton, were heavily imported. In 1919, however, the Union proved to be not only self-supporting but had a considerable export balance in all foodstuffs except wheat and mutton, and in these products the import balance was reduced almost to zero.

The flock management in the Union, with respect to the type of sheep, resembles that of Australia more than any other country. The Merino is the dominant breed, and the Wanganella type seems to be the favorite, although the Tasmanian Merino is plentiful in some localities. The Rambouillet is the basis for many of the range flocks in the dry Karroo district, but the wool of this type is likely to become short and harsh under the dry conditions that prevail. A few mutton types from England have been imported, but they are confined chiefly to the agricultural districts of Natal.

Some of the stations in the Union, especially in the Midlands of the Cape Province are among the finest stud farms in the world. On these farms the range is fenced into paddocks that are proof against jackals and lynx. Dipping is practiced twice a year. The

sheep are never penned in dusty kraals; a modern wool shed is provided, the wool is skirted, classed, and packed after the manner of the Australian system, and ample winter feed is supplied either in the form of alfalfa or oats. In short these farms represent about as high a development in flock management as is to be found in any part of the world.

It must be emphasized, however, that these are exceptional rather than average stations. Farther west in the Karroo district the range is unfenced; and, in order to protect the flocks against predatory animals, they are penned in dirty kraals overnight, with the result that the wool is poor and the flocks are often diseased. Little or no winter feeding is practiced, and the whole system is primitive in its organization.

Still a second system of management is common in the Transvaal and Orange Free State. On the high plains of these Provinces the rainfall, and therefore the pasturage, is confined to the summer months and the flocks must be driven to the lowlands, 150 to 200 miles away for wintering. It is usual for a farmer to own a base ranch on the high veld, where the homestead activities are carried on, and another farm in the lowlands equipped only with temporary quarters. Lambing is done in the lowlands, but shearing and dipping, when practiced, take place at the homestead. Shearing is done by hand with native labor, and no classing, skirting, or pressing of the wool is performed. Dipping is irregular and the whole establishment is like the more backward ones in the Rocky Mountain States. The same annual migrations between the lowlands and the mountains occur, but in the case of South Africa the homestead is in the high country and the valley farm is the make-shift establishment. Formerly little winter feeding was practiced; in some cases, however, instead of making the long trek to the winter range, enough feed is raised to tide the flocks over the drought.

The cost of establishing one of the better class of farms in the Midland of the Cape Province, according to an experienced South African sheep raiser, is about $85,000, exclusive of investment in land, for a station carrying 6,000 sheep. If the land is owned, about 15,000 acres worth $10 per acre, will be required, or a total investment of about $235,000 for the whole establishment. This is at the rate of about $40 per head of sheep.

The Commission obtained direct cost and investment data for 12 sheep stations for the year 1918, 8 of which carried ordinary flocks and 4 of which were stud farms. According to these reports the 8 ordinary flocks show an investment in land of about $30 per head, in equipment and improvements about $9.50 per head, and in sheep

more than $8, or a total investment of $47.50 per head. The 4 stud farms show an average total investment of more than $100 per head.

The receipts per head from the ordinary flocks average $6.25; expenses, $2.17, exclusive of interest; and profits, $4.08. Comparative figures for the stud flocks are $10.31, $4.70, and $5.60. If interest is included in cost, however, the results are completely changed. The imputed interest at 6 per cent on the total investment averages $2.85 for the ordinary flocks and $6.17 for the stud flocks—in both cases a larger figure than all other expenses—and if this item is included in cost, three out of the four stud farms and four out of the ordinary ones show a loss.

In normal times about 60 per cent of the farmers sell their wool to local merchants—unclassed and packed in a haphazard manner; the other 40 per cent sell through private brokers. These brokers may in turn sell the wool privately or in some cases, especially at Durban, in Natal, at public auction.

Prior to the war, South African exports of wool went chiefly to England and Germany—in 1913, 52 per cent to the former and 33 per cent to the latter country. The war changed the situation, however, and unlike the arrangement with her other Dominions, Great Britain was unable to reach an agreement with South Africa in regard to the purchase of the clips during the war. Some Imperial purchases were made but the greater part of the wool since 1915 has gone to the United States and Japan. In 1917, about 76,000,000 pounds out of a total clip of 140,000,000 pounds came to the United States. The imports to this country in recent years remained about the same, although the percentages of the total exports represented by these figures declined from 54 in 1917 to 30 in 1919. For the year ending June 30, 1920, over 42,000,000 pounds were sent to this country or roughly one-fourth of the total exports from the Union in a normal year.

The industry has been greatly stimulated by the high prices in recent years and a considerable increase in the number of sheep may be expected if the present depression in the wool trade is of short duration.

Taken altogether the peak of the industry in the Union, unlike that in most other portions of the world, seems to be far ahead. The growth may be slow because it will wait upon the spread of irrigation, but the goal of 50,000,000 sheep for the Union—double the present number—does not seem impossible of attainment.

PHYSIOGRAPHICAL FEATURES.

The Union of South Africa, composed of the Cape of Good Hope, Natal, Transvaal, and the Orange Free State, occupies the southern

portion of the African Continent and lies in a latitude south of the equator relatively similar to the southern portion of the United States in the northern hemisphere. The area of the Union is slightly less than 475,000 square miles, or about equal to the combined area of Colorado, Wyoming, Idaho, Utah, and Nevada.

The predominant physiographical features of the region are the great half-moon of mountain country bending round the southeast coast and the high interior basin of the Orange River on the inner side of the crescent.

The mountain country is highest and widest in the northeast portion of the Union, where the table-land lies from 5,000 to 8,000 feet high and is a hundred miles wide. The Province of Natal lies along the flanks of the mountains facing southeast and the land slopes sharply to the coast. There is a very little level land in this Province and the jumble of mountains and hills is cut by numerous water courses. The prevailing winds during the summer come from the southeast. As they ascend the slope heavy rainfalls occur in the foothills. This precipitation, ranging from 50 to 70 inches annually, in Natal, together with the low altitude, fosters a semitropical vegetation on the coast where palm trees are the dominant feature of the landscape. At a higher altitude grass covers the rough hills to their summits and rich pasturage is afforded both sheep and cattle all the year.

Back of Natal, beyond the rough mountains but on the high table-land, is the great plateau of Orange Free State. For the most part these plains lie from 4,000 to 7,000 feet high, are treeless and subject to great extremes of temperature. They are covered with short grasses that are green and nutritious during the summer rains, but unlike the grasses of the Rocky Mountain States, they are of little value for hay or pasture when cured or dry. In the eastern and southern portions of this region the rainfall is around 30 inches annually and some agriculture is possible without irrigation, but the rain thins out toward the west where 15 to 18 inches is the average and grass is available for livestock only part of the year.

North of Natal and Orange Free State lies the Transvaal. This country is likewise a high table-land, especially in the southern portion where the topography, climate, and vegetation are much like that of the Orange plains. In the northern half, however, is found the Bush Veld—high plains that are neither timbered nor treeless, but which present a parklike appearance with isolated trees scattered over the landscape. Formerly great herds of wild game roamed over this territory and these, passing through the patches of sunshine and shadow, gave the country an appearance of fertility and plenty that, in fact, it does not possess. The grasses are harsh and thin for the most part and the rainfall of 15 to 20 inches provides but

scant water for livestock. Along the eastern border, however, are much lower plains, fairly fertile and watered, marshy in places, and heavily wooded. Along the rivers the lands are safe for neither man nor beast because of fever and pestilential disease.

West of Natal and Orange Free State lies the great desert region of the Cape of Good Hope. In the southern part the half-moon of mountains recedes inland about 150 miles and between it and the coast there is a washboard of alternate plains and mountains down to the tip of the continent. Two of these intermountain plains are famous as the Great and the Little Karroo. These are flat, bare regions where the heat is intense in summer and the cold severe in winter. No vegetation grows except cactuslike plants which store up moisture for the dry season, and a species of acacia called "Karroo bush." This bush and some of the succulents furnish good food for livestock, however, and the country is not so useless as it appears. The rainfall on the Karroo is only 10 to 12 inches and comes in short, violent showers.

North of the Karroo, beyond the horn of mountains, lies the Karroid plateau—a vast treeless region stretching north for hundreds of miles, level for the most part, but set with scattering flat-topped mountains. Short wire grass grows in rifts here and there and on the north the region merges into the Kalahari Desert of southern Africa. The Karroid is only the southern portion of the lower Orange Basin and the whole region is desertlike in appearance. The rivers have cut deep fissures in the plains and the resulting hills are bare and weathered. Far to the east the basin rises toward the plateaus of the Transvaal and Orange Free State, and is therefore better watered and has more grass than the lower portions. It is separated, however, from the table-land, by the mountain escarpment which hedges the basin like the rim of a dish.

Along the western coast, bordering the ocean, a desolate sandy desert covers the whole area, and only at the very tip of the continent are the winter winds of the Atlantic lifted sufficiently by the mountains to drop their moisture on the land.

The temperature through the year as a whole is equable in South Africa, but violent local changes are common over most of the area. The mean annual temperature is 63° F., and 50° is a low average for the winter, but the daily range is sometimes as great as 100°, especially on the high plateaus. Frosts seldom occur in the low countries, but are frequent on the table-lands. Snow sometimes lies on the mountains for several months, but otherwise is practically unknown. On the whole, the climate is such that sheep can live in the open the year round if shelter is provided against sudden storms and severe winter winds. In some places nature has provided this shelter in the kopjes or low flat-topped hills. In others a windbreak of trees is sufficient.

From this description of the physiographical features of the country it is obvious that Natal is best fitted for agricultural pursuits. Rough hills and mountain valleys are the rule rather than fertile plains, but the rainfall is sufficient for rich pasture. Farther north and west the high veld of Orange Free State and the Transvaal are covered with grasses, though the drought causes them to be suitable for pasturage only five or six months in the year. Westward from this area the rainfall thins out as the winds drop down the mountain slopes, and short grass, Karroo bush, and cactuslike vegetation are the only kinds of food for sheep and cattle. Not only is the rainfall scant over most of the country, but the high mountains induce thunderstorms and the water as it falls runs off the bare plains. The watercourses are dry most of the year except along the southeastern seaboard, but are torrential immediately after the rains. For this reason it is almost impossible to construct irrigation dams that will withstand the weather, and for years to come most of the land will probably be desertlike for the greater part of the year.

Let it not be supposed from this description that there is little or no good farming land in the Union. The absolute amount of fertile soil is large, although as compared with the great area of arid plains it is small, only about 5 per cent, according to official estimates.[1] In the eastern portion among the mountains there are many fertile valleys where crops grow luxuriantly without irrigation, and even on the upland plains of Orange Free State and the Transvaal, near the mountains, the winds are cooled sufficiently to drop enough moisture for farm crops. Over large portions of the country the soil is productive where water may be obtained for irrigation purposes, but the difficulty of controlling the rivers makes the spread of irrigation slow. In many cases small fertile valleys form the basis for pastoral settlements which range their flocks over great areas of the back country. On the whole, however, the territory will never support as dense an agricultural population as is found in New Zealand, for example, or in many other portions of the British Empire.

LAND SITUATION.

Private Holdings.

In general there are three classes of rural landholders in South Africa: (1) the Boer farmers, descendants of the original Dutch settlers; (2) the mining companies; and (3) English ranchers, some of whom hold relatively large estates.

[1] According to estimates supplied to us by the representatives of the Irrigation and Lands Department of the Union Government (unsupported by actual survey) only 5 per cent of the area of the Union is capable of permanent cultivation either by means of irrigation or on account of regular and sufficient rainfall.—Dominions Royal Commission, Third Interim Report, p. 30.

The first of the Dutch settlers were brought to the Cape of Good Hope by the Dutch East India Co. about the middle of the seventeenth century. During the next 150 years they spread over the tip of the continent, chiefly along the coast, but as late as the year 1800 there were only about 2,500 white settlers in the whole territory.

About this time (1806) England took possesion of the Colony and English settlers began to arrive in considerable numbers. In two years alone (1820–21) some 5,000 of them arrived and were established in the eastern portions of the Cape Province.

By 1835 the clash of Dutch and English settlers had become so great that large numbers of the former left the coast district and began a long "trek" inland to seek new lands where they would be unmolested. In the next 20 years many thousands of the Boers migrated farther and farther into the wilderness and penetrated the territory which later became the Orange Free State and the Transvaal. These settlers were essentially farmers and their descendants have in the main kept to the soil. In the course of time orderly land laws were worked out and, almost uniformly, each man received 3,000 morgens (about 6,500 acres of land). Each one lived to himself and depended upon his domestic establishment for practically all his needs. Cattle, sheep, and goats were raised, but little or none of their products was marketed.

As the country became more thickly settled, it would have been natural had the Boer farmers turned more and more to what may be termed the business of farming as distinct from pioneer domestic conditions, but the traditions of self-sufficiency and independence persist strongly and only grudgingly are the old ways given up. In most cases the farms among the Boers have become much smaller than the original grants because of the practice of equal division among the sons of the family. In some cases the family estate is kept intact, but for the most part no such unbroken title to large holdings is found among the Boers as is the rule among English settlers. Farms, relatively small in terms of carrying capacity, running a few sheep, cattle, and goats, cover most of the rural districts, and scientific agriculture and stock breeding make headway slowly. It is largely because of this conservatism among the farmers that the industrial centers of the Union import large quantities of meat and dairy products, although potentially the Union is a great pastoral country.

The second class of holders, i. e., the mining companies, although controlling considerable areas are not important factors in the land situation. Most of their holdings are high and dry pastoral land which is rented for a nominal sum.

No figures are available as to the number of landholders of English descent as compared with the Boers, but many of the larger

farms, or estates, as some of them may be called to indicate the extensive scale on which they are operated, are owned by Englishmen or their descendants. A few estates are almost feudal in their management. Many square miles of territory are occupied by ten or a dozen tenants who pay rent in kind to the landlord and give and take many other favors under the terms of the contract.[2] In other cases the relation between tenant and landowner is that of employer and employee with the added stipulation that the employee may run sheep (sometimes amounting to several thousands), for his own profit in connection with the main operations. Even on the Boer farms it is common for the native herdsmen to squat on the master's estate and run a few sheep and goats for their own profit.

Crown Land.

For the most part, the good public land of the Union was occupied years ago; the remaining area is largely unfit for agriculture or grazing. On March 31, 1918, the total area of unalienated land available for settlement was about 45,000,000 acres, of which something over 27,000,000 were in the Cape Province, about 250,000 in Natal, and nearly 15,000,000 acres were in the Transvaal. This total acreage available for settlement may be contrasted with the total area of the Union which is roughly 300,000,000 acres. Crown lands constitute about 14 per cent of the total area, but because of their poor quality no important development in the future may be looked for from their occupation by settlers.

There is, however, in the land laws of the Union one provision which offers an opportunity for bona fide settlers even though all the good land is privately owned. This provision is similar to the Closer Settlement Act of New Zealand and stipulates that at the discretion of the Minister of Lands private holdings may be purchased and offered for settlement to qualified applicants. Many rules govern the transfer of lands under this law, the essential ones being: (1) The land may be leased for five years at a rental varying from nothing the first year to 3½ per cent of the purchase price the fifth year, with the option to purchase it on 20-year term payments; and (2) the land may be purchased outright by a payment down of one-fifth of the cost to the Government.

This law was passed in 1912, but in August, 1914, the outright purchase provision was suspended and remained so until the end of 1917. The leasing clause, however, with the right of ultimate purchase, has been in force since 1912, and down to March 31, 1918, 2,959,402 acres had been allotted to 1,256 applicants, or an average of 2,357 acres to each man. In the brief time the purchase clause has been in effect, something over 230,000 acres have been sold to

[2] Colquhoun, A. R.: The Africander Land, p. 273.

266 applicants in 218 blocks for a valuation of something over £328,000, or an average of 1,055 acres per block, valued at $6.94 per acre.[8]

In addition to the Crown lands and the lands privately held which may be purchased by the Government for closer settlement, there is a large body of native lands that can not be purchased by settlers except by permission of the Government. The total of these lands, including direct native ownership, native reservations, and mission reservations, was about 27,000,000 acres in 1918, or something over 8 per cent of the total area. Some of this land is quite fertile and is among the most valuable tracts in the Union. The prohibition against white settlers on native lands extends only to ownership and not to occupation by lease. A considerable number of native areas are rented to white sheep farmers, though the Government keeps a watchful eye on the terms of the contract. Other Government reserves not available for settlement amount to several million acres. The net result of the land situation in the Union is that, roughly, 200,000,000 acres are privately held and only about 50,000,000 acres, most of which are poor for agricultural purposes, are available for future settlement.

Of these 200,000,000 acres of freehold land, almost exactly 7,500,000 acres were under agricultural crops in 1918, and of this amount nearly 1,000,000 acres were irrigated and 2,318,056 acres were irrigable. From these figures it will be seen that only about one-twentieth of the freehol l land is cultivated, or less than one-thirtieth of the whole area of the Union.

More detailed statistics of cultivated and pastoral areas are given in the following table. Native lands are included, though not all of them are privately owned.

TABLE LVI.—*Area of farms in 1918.*[a]

[000 omitted.]

Province.	Total area.	Area cultivated.	Ratio of total area cultivated
	Acres.	*Acres.*	*Per cent.*
Cape of Good Hope	121,569	3,152	2.6
Transvaal	31,121	3,013	9.6
Orange Free State	29,250	2,815	9.6
Natal	8,709	1,107	12.7
Native reserves, etc.	37,618	3,770	10.0
Total	229,270	[b] 13,857	6.0

[a] Supplement to Half Yearly Abstract of Union Statistics, June, 1919, p 3.
[b] The area cultivated includes native reservations which were not included in the areas under agricultural crops

From Table LVI it will be seen that only about 6 per cent of the freehold area is cultivated. Without a knowledge of the physi-

[8] Official Year Book, Union of South Africa, 1910–1917, p. 391.

ographical and climatic conditions in the Union, it might be inferred that these figures indicate merely a pioneer stage of agricultural development, and that although most of the country is now used for the production of pastoral products, agriculture will spread in the future as in the past in such countries as New Zealand, Canada, and the United States. In view, however, of the desert and semidesert conditions over most of the Union, the tendency toward intensive agriculture is not pronounced. Only by the use of irrigation will farm crops become an important factor in the Union. Because of the difficulties of impounding the water in the steep mountain valleys and the almost complete lack of it in great areas on the plains, irrigation will probably for years to come be an adjunct to stock raising rather than a direct means of raising crops for the market. Upon this subject the Director of Irrigation for the Union expresses the following opinion:

At present I think there can be no question that this country, as a whole, must be considered mainly as a pastoral one, and its future, I think, largely lies in that direction, so that irrigation is to a very large extent an adjunct to stock farming, and in that sense we are only at the fringe of our development. Vast areas of the country are being stocked, at present, on the basis of a condition of drought. Large areas will only carry 1 sheep to about 10 acres, whereas with a very little extension of irrigation on the farms by means of small dams or bore holes it is possible to grow fodder, lucerne, or winter feed, and immediately double the stock-carrying capacity of the farms. Then again, it must be remembered that, owing to the peculiar geological conditions, we have comparatively little soil in the country which is alluvial. Most of the country is composed of very ancient formations—thin soil with narrow ribbons of intensely rich alluvial valleys; but they form a very small proportion of the entire area of the country. Naturally, all these valleys have attracted the best people, and they will always form areas on which closer settlement can be encouraged. Then, again, it must also be remembered that, unfortunately, the greater part of South Africa was practically partitioned among a comparatively few white people in days gone by, and the only land which is left in the hands of the Government is either unhealthy country or desert, like the Kalahari, Bushman Land, and parts like that, where from an irrigation point of view nothing could be done. There is no water to irrigate with, and as far as development of underground supplies is concerned, experiments so far made go to show that it is both precarious and sometimes bad in quality.[4]

There is relatively little leasing of land in South Africa as compared with Australia or even with the Range States of the United States. Out of a total of about 76,000 farms, something over 18,000 are leased, including the small gardening areas in the coastal plain, but excluding native holdings. In addition to this number nearly 7,000 farms are occupied on the share system and about 6,500 are run by hired managers. Expressed in percentages, about 58 per cent

[4] Testimony of Mr. Francis Edgar Kanthank, Director of Irrigation for the Union of South Africa, Minutes of Evidence before Dominions Royal Commission in the Union of South Africa in 1914, p. 1.

of the farms are occupied by the owners, 24 per cent are leased, 9 per cent are occupied on shares, and 9 per cent have hired managers.

Value and Carrying Capacity of the Land.

Because of the size of the Union and the diversity of conditions, land values naturally vary widely among the different provinces. Even within a given district values run from practically nothing to several hundred dollars per acre, and the Crown lands themselves, though entirely unimproved, range from less than $1 per acre in the semidesert regions to more than $100 per acre for small irrigable allotments.

More pertinent for present purposes is the value of range land for sheep grazing given in the following table:

TABLE LVII.—*Value of sheep land in South Africa, 1918.*[a]

Province.	Value of land per acre.	Carrying capacity per acre.
Cape Province:		
Southeast coast—		
Western section	$6.90-$10.35	1 sheep to 2-3 acres.
Central section	11.50	1 sheep to ¾ acre.
Eastern section	4.60- 6.90	1 sheep to 1 acre.
South Karroo	1.00- 5.00	1 sheep to 4-8 acres.
Eastern Karroo	4.60- 9.25	1 sheep to 2-4 acres.
Great Karroo	1.15- 4.60	1 sheep to 6-7 acres.
Karroid Plain (dry interior)	1.15- 3.45	1 sheep to 4½ acres.
Northwest coast	.85- 1.75	1 sheep to 8 acres.
Orange Free State:		
Eastern part	9.25- 13.80	1 sheep to 1 acre or less.
Central part	6.90- 11.50	1 sheep to 4½ acres.
Western part	2.30- 4.60	1 sheep to 2 acres.
Natal	2.85- 13.80	1 sheep to 1 acre.
Transvaal:		
Eastern part	11.50	1 sheep to 1 acre or less.
Central part	8.00	
Western part	2.85- 6.90	

[a] Data obtained through personal interviews with land owners by representatives of the Tariff Commission.

The figures in this table indicate that very little land used for sheep will carry more than one head to the acre and that such land will cost around $10 per acre. The other extreme is reached in the deserts where land is in use with a carrying capacity as low as 8 or 10 acres per sheep and costing around $1 per acre.

DEVELOPMENT OF THE SHEEP INDUSTRY.

South African industries have all developed rapidly since the formation of the Union in 1910. This is especially true of the sheep industry, the present number of sheep and the exports of wool entitling her to a place as one of the great wool-producing countries of the world. The number of sheep reported in 1918, almost 30,000,000, places her slightly ahead of the United Kingdom, reporting about 27,000,000, and of New Zealand, reporting over 26,000,000. Of the 30,000,000 reported for South Africa, however, about 5,000,000 were woolless sheep and these were used almost exclusively for mutton.

The present flourishing condition of the industry is the culmination of efforts begun over 200 years ago, but only recently have there been great advances in number and quality.

The early Dutch colonists were obliged to raise their own foodstuffs, and from the beginning sheep raising was one of their chief industries. Wherever they went, they carried their customs and industries. They first used the native sheep, a woolless hairy animal with a broad fat tail. Importations of rams and ewes were made as early as 1654 for the purpose of crossing with the woolless sheep.

The pastoral industry maintained its rank for 150 years but there was no real progress along any line until the middle of the nineteenth century. Difficulties with the natives and the seminomadic lives of the Boers as they withdrew farther away from the more thickly settled coast districts account for this in part. Probably the chief reason lies in the widely separated and isolated settlements of the grazing country.

After the establishment of the Dutch Republics in the Orange Free State and in the Transvaal about 1850, there was an improvement in conditions. The discovery of great mineral wealth in the Transvaal in 1867 affected the sheep industry indirectly. While it brought in numbers of men, it also drew men from the farms to the mining areas, and all industries received an impetus. In 1855 products exported from the country amounted to about $4,700,000, while in 1875 they had risen to over $19,000,000. During that same period the production of wool increased from 12,000,000 pounds to 40,000,000 pounds, or a little over 300 per cent.

For the last 50 years the trend of the sheep industry has been slowly but steadily upward. The most marked growth has been since the establishment of the Union in 1910, and this progress has been almost altogether along the lines of improvement of methods rather than through new settlement.

No data are available as to the number of sheep in the Union prior to 1904, but the following table gives the number since that time:

TABLE LVIII.—*Number of sheep in the Union.*[a]

[000 omitted.]

Year.	Total	Wooled sheep.	Other sheep.	Ratio of other sheep to total.
				Per cent.
1904	16,323	11,821	4,502	27.58
1911	30,657	21,842	8,815	28.75
1912	35,889	27,331	8,558	23.84
1913	35,808	28,328	7,480	20.89
1915	31,434	25,944	5,490	17.46
1916	31,981	26,491	5,490	17.20
1918	29,914	25,059	4,855	16.23
1919	[b]28,491	23,548	4,943	17.35

[a] Quarterly Abstract of Union Statistics, January 1920.
[b] Bulletin No. 4, The Wool Industry, U. S. Department of Agriculture, reports 35,596,085 sheep in the Union in June 1919. No explanation of the discrepancy in the two reports is to be found.

From this table it will be seen that the number of sheep, both wool and woolless, almost doubled in the six years between 1904 and 1911. In both years the woolless variety constituted over one-fourth of the total number, but by 1918 had decreased to about one-sixth of the total. The number of wool sheep has decreased somewhat since 1913—from about twenty-eight and a third millions in that year to about twenty-three and one-half millions in 1919. The recent decrease is due not only to war conditions but also to a drought, which was more serious than usual.

In 1918, 72 per cent of the total number of sheep in the Union were Merinos. Figures for other years are not available, but it is obvious that the Merino is the dominant type in the country.

Table LIX, showing export figures for wool, is more striking evidence of the growth of the industry. Inasmuch as practically the entire clip is exported, these figures reflect the production accurately except in recent years when inadequate transportation facilities have resulted in irregular shipments.

TABLE LIX.—*Exports of wool from South Africa.*[a]

[000 omitted.

Year.	Quantity.	Value.	Year.	Quantity.	Value.
	Pounds.			*Pounds.*	
1826	53	£0.5	1895	65,633	£1,696
1875	216	15	1900	27,671	888
1840	911	46	1905	63,474	1,887
1845	3,220	177	1909	102,347	2,855
1850	5,913	286	1911	132,207	3,900
1855	12,016	634	1912	161,975	4,781
1860	23,173	1,447	1913	176,972	5,719
1865	32,768	1,681	1914	133,981	4,238
1870	37,283	1,670	1915	170,003	5,380
1875	40,340	2,856	1916	136,000	6,602
1880	42,469	2,429	1917	117,657	.....
1885	34,433	1,426	1918	115,634	9,723
1890	65,656	2,196	1919	184,740	17,948

[a] Figures to 1916, inclusive, are from the Guide Book to South and East Africa, 1918, p. 222; figures for 1917 from the Year Book for the Union for 1910–1917; figures for 1918 and 1919, from the U. S. Commerce Report Supplements, Aug. 16, 1920.
The exports to 1909, inclusive, are from the Cape of Good Hope.

From 1856 to 1860 the quantity of wool exported almost doubled, but remained fairly constant in the 20 years from 1865 to 1885. In the next 5 years the exports doubled again, after which they remained almost a constant figure for the next 15 years, except for the year 1900, when they decreased heavily. From 1905–1911 they again doubled and have remained fairly constant since that time. It is obvious that the heavy shipments in 1919 were due in part to the partial storage of the 1917–18 clips. Briefly stated the table shows that during three five-year periods since 1850 the exports of wool have doubled with long periods in between during which they have remained almost constant.

The development of the sheep industry itself in South Africa is important, but the growth of other competing industries is almost equally important if any judgment is to be passed upon the probable future tendencies in the Union. Table LX is therefore given to show the output of the chief agricultural and pastoral products since 1904.

TABLE LX.—*Competition of other industries with sheep industry in South Africa.*

[000 omitted.]

Year.	Sheep.	Cattle.	Angora goats.	Ostriches.	Dairy products.	Maize.	Tobacco.
	Number.	*Number.*	*Number.*	*Number.*	*Pounds.*	*Bushels.*	*Pounds.*
1904	16,323	3,500	.....	361	.....	13,898	.....
1911	30,657	5,796	4,275	747	.....	30,830	14,981
1912	35,889	.....	4,395	.....	.....	.....	.....
1913	35,808	.....	4,194	776	.....	.....	.....
1914	.....	.....	.....	.....	11,327	.....	.....
1915	31,434	.....	2,844	.....	14,505	.....	.....
1916	31,981	.....	2,564	300	13,980	.....	.....
1917	.....	.....	.....	.....	19,469	.....	.....
1918	29,914	6,851	2,731	.....	26,122	48,143	14,931
1919	28,491	5,575	2,697	282	.....	41,237	14,185

From this table it may be inferred that sheep raising is not threatened by the spread of any other livestock industry, but that a little competition may be expected from dairying and corn raising. Eight or ten years ago the raising of ostriches occupied the attention of a large number of farmers—more attention, perhaps, than these figures would indicate. The future seemed bright for the industry, but the Great War seriously affected it, and it is probable that it will never again occupy the place relative to other products that it did 10 years ago.

TABLE LXI.—*Progress of South Africa's trade as shown by imports and exports of agricultural and food products, 1910 and 1919.*[a]

[000 omitted.]

Article.	Imports.		Exports.		Balance in favor of imports and exports	
	1910	1919	1910	1919	1910	1919
Wool ..... pounds	.....	.....	121,608	184,928	.....	.....
Angora hair ..... do	.....	.....	17,817	16,942	.....	.....
Ostrich feathers ..... do	.....	.....	741	904	.....	.....
Maize ..... bushels	.....	.....	6,362	4,397	.....	.....
Wheat ..... do	3,517	753	.....	37	[b] 3,517	[b] 716
Bacon and hams ..... pounds	5,466	41	24	1,331	[b] 5,442	[c] 1,2[illegible]
Butter ..... do	3,606	356	154	453	[b] 3,452	[c] 97
Cheese ..... do	4,651	20	21	1,547	[b] 4,630	[c] 1,527
Beef ..... do	2,989	.....	235	44,409	[b] 2,754	[c] 44,409
Mutton ..... do	2,776	173	62	46	[b] 2,714	[b] 127
Sugar ..... do	59,352	5,655	6,102	38,047	[b] 53,250	[c] 32,392
Currants and raisins ..... do	1,930	1,256	13	4,023	[b] 1,917	[c] 2,767

[a] London Times Trade Supplement, May 22, 1920, p. 254. Figures for wool, angora hair, ostrich feathers, and maize, from Quarterly Abstract of Union Statistics, April, 1920.
[b] Imports.
[c] Exports.

Table LXI shows that such products as wool, angora hair, ostrich feathers, and maize were heavily exported in both 1910 and 1919. But the foodstuffs, without exception, show a heavy import balance for 1910. By 1919 the Union had changed from an importing to an exporting country with respect to most of the food products. Bacon and ham, for example, shifted from 5,500,000 pounds imports in 1910 to over 1,200,000 pounds exports in 1919. Beef shifted from an import balance of 2,750,000 pounds in 1910 to more than 44,000,000 export in 1919. Mutton, however, never reached the net export stage, according to these figures. Wheat likewise failed of export, but the import balance was reduced in both cases.

Taken altogether this table shows that within the last five years South Africa has become self-supporting in agricultural and food products. Undoubtedly much of the change from an importing to an exporting basis was due to the war, but it is probable that the old conditions will not return for many years, if ever. It should not be assumed, however, that the progress of intensive agriculture will tend to deter the sheep industry, because the physiographical and climatic conditions are such as to render the Union fundamentally a pastoral territory.

FLOCK MANAGEMENT.

Types of Sheep.

The sheep of the Union are varied in type and still more varied in quality, but the Merino strain is dominant, about three-fourths of all wool produced being of that type. The earliest settlers found a native sheep—long-legged, light, with a broad, fat tail, and covered with nondescript hair. It was valuable for mutton and was used for revictualing ships which passed at the Cape. This type of sheep is still bred to some extent in the western part of the Cape, but holds no rank in the wool industry.

During the sixteenth century stock was imported from the best flocks in Holland and from the Merinos of Spain. In 1790 Merinos of the Escurial breed were introduced. English breeds were brought in by the settlers of 1820 and later purchases were made of the Rambouillet and Saxon Merinos. In the early days the sheep generally known in South Africa as the Merino was obtained by crossing the native sheep with imported Merino rams of varying types.[8] For many years the seclusion of the Boer farmer in the back country led to continuous inbreeding of the flocks, with the result that the average fleece deteriorated until it weighed only 4 or 5 pounds and was poor in quality.

About 1870 a few of the more progressive farmers imported some of the famous Australian Merinos. The quality of the wool imported

[8] Guide to South and East Africa, 1918, p. 221.

improved from the first, but it was some years before there was any appreciable advance in the weight. Since the Boer War large numbers of pureblood Merino rams and ewes have been imported, and on farms where the best methods are used fleeces now average from 9 to 10 pounds.

In 1907, the Germans introduced the Karakul sheep of Bokhara. It is very hardy, yields good mutton, and can be readily crossed with the native sheep. The breed is largely confined to the western Cape, and seems not to be increasing in favor.

The Merino breeds are eminently adapted to the greater part of the natural pasturage of South Africa. They are the basis for all general breeding, both for producing ewes for sale and early mutton lambs. Pure Merino Cape wools are steadily coming into favor and more care is being used in selection. The three most popular types of pure Merinos are the Wanganellas, Tasmanians, and Rambouillets. At the stud sale of 1919 top prices were paid for the Wanganella rams, and flock rams of that breed sold for more than equally good rams of the Tasmanian breed At this sale one Wanganella ram brought $7,400, another $7,100, and six ewe lambs, also Wanganellas, brought $500 each. The Wanganellas are well adapted to conditions in the Karroo and grass veld districts, where there is a rainfall of less than 25 inches. They are much hardier than the Tasmanians, although slightly inferior as to wool. Pure Wanganellas bear light combing wool, and are large framed, plain bodied, with strong constitutions and good fronts. Fleeces from stud rams weigh from 20 to 30 pounds, and the weight from the average flock is 9 or 10 pounds.

Although the Wanganella breed is the most popular, Tasmanians thrive in damp districts and the greatest numbers are found in the southwestern part of the Cape Province, where winter rains are prevalent. Some fine Tasmanian flocks are also kept in the high veld districts of the eastern Transvaal, where the rainfall is plentiful in summer.

The Rambouillet is the hardiest of the three breeds, but its wool is, as a rule, inferior to the other two, being shorter and harsher. This type does best in the dry Karroo, but the wool becomes very short in staple unless careful breeding is followed to adapt the sheep to the dry conditions. The rams are noted for their size of carcass. They sometimes weigh over 200 pounds and shear up to 20 pounds or more of wool.

The American Rambouillet is considered by many to be the best all-round sheep for a hot climate like the Karroo. It has a large frame, with good staple wool, which is not so soft and silky as the Australian Rambouillet.

At one time the Vermont type of Merino was popular, but at present the number of these is small. They lost favor because of the great shrinkage of the wool in the process of scouring.

Mutton type.—Although the Merino is by far the most popular sheep in the Union, several English varieties have been imported with the object of working up an export trade in mutton. These include Oxfords, Hampshires, Romney Marsh, Suffolk, and others. Their importation is confined largely to the mixed farming districts of the Orange Free State and Natal, where markets are easily accessible. Because of the semidesert condition of much of the Union, it is probable that the number of crossbreds will always be small as compared with the Merino type. That is to say, South Africa will probably follow more in the steps of Australia than of New Zealand with respect to the relative importance of wool and mutton.

In the western part of the Cape Province a cross between the Persian and the native sheep has proved profitable for mutton. These districts are near the large centers of consumption and under rigorous climatic conditions the cross can be more easily fattened for market than the wooled sheep.

Typical Sheep Farms.

Because of the diverse conditions existing in the Union, perhaps no two men would agree as to the characteristics of a typical farm in South Africa, but in order to give a clear-cut picture of some of the stations, whether typical or not, two or three farms will be described in some detail, one in the Transvaal and the others in the Cape Province.

The Transvaal farm is owned by a progressive Boer farmer and contains about 6,000 acres carrying 5,000 sheep. In addition to this homestead, the owner has two other farms of about 4,000 acres each, nearly 200 miles away in the lowlands, which are used for winter range.

The buildings are all of stone and comprise a low rambling house covered with corrugated iron, a stable, a wool shed holding about 100 bales, a wagon house, and other outbuildings. In addition to these there are stone kraals for sheep at various places on the farm.

Native labor is used exclusively, and the "boys," as they are called, squat with their families on the master's land. A few sheep, cattle, and goats are kept by each native family at the expense of the employer. The native women are house servants at the homestead and the whole establishment is feudal in its organization.

During the summer sheep run on the home farm and, because of the rains (about 30 inches, chiefly in the summer time), the range carries about two sheep to the acre. With the coming of the autumn, however, the rains stop and the grass dries up, not into a nutritious

hay, as is the case in the dry areas of the Rocky Mountain States, but into a harsh, woody grass without value for forage.

With the approach of autumn the long trek begins toward what is called the winter range, although the climate in the lowlands of eastern Transvaal is warm all the year round. The sheep are divided into bands of about 500 head and each band is put in charge of two natives. The whole 5,000 head, therefore, are divided into 10 bands in charge of 20 boys. In addition, two or three white men go on the trek as supervisors. Slightly different routes are taken and the flocks drift 6 or 7 miles a day, although in an emergency they can live off the country and travel 12 to 15 miles a day. After about 30 days of drifting, the high plains are left behind and the country becomes low and wooded in places with plenty of water in the streams. When the winter ranch is reached the herders settle in temporary quarters and for three or four months they herd the bands much as is done in the Rocky Mountain States, using special care to prevent the mingling of the flocks with native sheep which are always infected with scab. If the grass runs short on the owned land, pasturage is rented for a nominal sum from the native rulers of the district.

Lambing is done in the lowlands usually in May (corresponding to November in north latitudes) and by August or September the flock is ready for the trek back home. Soon after reaching the homestead, shearing takes place and the wool is hauled by ox teams 15 or 20 miles to the railway station.

The shearing equipment is primitive, usually merely a plank and a pair of shears for each man. All shearers are natives and 30 head per day, per man, is a good average, for which is paid about 75 cents or 2½ cents per head. In packing the wool, little or no sorting and skirting are done and no pressing. Instead a large wool sack is hung by the four corners and the fleeces are trampled in as they come.

Dipping is not common among the Boer farmers, and the particular flock under consideration had not been dipped for eight years prior to 1919, when scab became troublesome because of contact with native sheep on the winter range.

Practically no mutton sheep are sold except occasionally 200 or 300 fat lambs to the local butcher. Every three or four years the flock is culled heavily of old stock which is sold for mutton or feeders. All rams are raised and no new blood has been introduced into this particular flock since 1903. On the other hand 30 to 40 rams are sold each year for $20 to $25 each.

No feeding is done as a rule, either in the winter or for the market, but occasionally in a dry year some feed is necessary to tide over the sheep until the trek to or from the lowlands is begun.

Among the more progressive flockmasters the practice of grazing all the year round is slowly giving way, however, to some feeding. The long drive to the lowlands is not favored by some men, especially since the trailing country is sometimes congested, and the sheep must be pushed too fast on the drive. To avoid this migration alfalfa and corn are being raised more and more for winter feed. Accompanying the movement toward winter feeding the range is being fenced into paddocks or pastures for the better utilization of the grass in different localities at different times in the year.

The establishment just described is distinctly above the average of Boer sheep farms in the Transvaal. Another farm, located in the Cape Province, where conditions are different, a progressive station owned by a Dutch colonial farmer, may be described, not as an example of a typical farm, but, as one of the best-managed estates in the whole Union, and one which represents about the highest development that can be expected in the country for years to come. This farm lies in the eastern part of the Cape Province, just south of the mountains, and about 150 miles from the coast. It contains about 14,000 acres of land and carries 6,000 Merino sheep. Much of the range lies back in the mountains, some of it as high as 7,000 feet.

The homestead is in the valley, and consists of a well-built house surrounded by groves and orchards, much like the best ranch stations in the United States. Near the house are barns and stables for about 75 work oxen, 10 or 15 head of horses, and about 50 head of mules and donkeys, all of which are used in connection with the sheep business. The wool shed is a stone building 125 by 22 feet with a cement floor and iron roof, and is equipped with shearing boards, tables, and a wool press. In short, it is much like the Australian shed except that it has no provision for machine shearing. Stone kraals cluster around the shed with provision for manipulating and dipping the sheep. Beyond the pens are fields of alfalfa about 70 acres in extent and of oats to about 160 acres. Beyond these, upon the flanks of the mountains, is the summer range fenced into large pastures or paddocks, in which the sheep may run without herders. A total of about 140 miles of fencing incloses the paddocks, 60 miles of which are jackal fence costing to-day nearly $800 per mile. The other 80 miles of 9 strands of wire on iron posts, costs at the present time $350 to $400 per mile. The farm's water supply consists of several natural springs, several windmills over bore holes, and 20 dams or pools, some of which are large, costing to-day about $4,000 as compared with $3,000 12 or 15 years ago, and others which are small and cost from $300 to $500. The larger pools serve the double purpose of furnishing stock water and irrigation water in the dry season.

The rains come in the summer (25 to 30 inches) and grass and vegetation flourish. Sheep do well on the range for six or seven months, but with the coming of autumn the drought sets in and for five months practically no rain falls. When the grass is exhausted the sheep are turned onto the alfalfa and the oat pastures and for two or three months they live off these crops almost entirely. When the spring rains begin again the sheep are taken off the cultivated fields, and good crops of oats and hay are usually cut and stored for further feeding.

On this farm the sheep run night and day without herders and only occasionally, chiefly after shearing, are they penned under flimsy sheds for protection against the cold rains.

Laborers on the farm consist of four white assistant managers (not counting the owner and his three sons) who receive $50 a month and board and 24 natives who receive about $3 per month and board. Board, together with clothes and incidentals, amounts to about $18 to $20 per month per man or a total of $22 or $23 per month for native labor.

Shearing is done entirely by hand and by natives who receive from 4 to 5 cents per head and board. Twelve to fourteen men do the clipping and six men, including the owner and the white managers, do the skirting, sorting, and pressing of the wool. Great care is exercised in the sorting process and 8 to 10 different sorts are made of the clip.

Little or no attention is given to mutton production on this farm, but high-grade Wanganella Merinos are produced exclusively. Since 1907 about $75,000 worth of Australian rams have been imported by this farmer and some of his own rams have been sold for prices as high as $6,000 and $7,000 each. Last year some of the wool sold for as much as 75 cents per pound in the grease, a record price for the Union up to that time. These prices of rams and wool are cited to emphasize the point that the establishment in question is not typical or average in any sense, but that it represents perhaps the highest development in finewool production of all stations in the Union.

In order to present the other side of the picture a somewhat general description of an average sheep farm in the dry Karroo district, farther west in the Cape Province, may be of interest.

A Karroo sheep farm consists of from 2,000 to 10,000 acres, carrying from 500 to 5,000 sheep. In case the flock is very large the owner probably runs two or more farms. The country is flat, bare, and stony, with no trees, very little surface water, and no grass. Here and there are ranges of low, flat-topped hills called kopjes, but the general appearance of the country is dreary and much like the deserts of the intermountain States of this country.

The buildings on the average farm include the homestead, stable, a shed of one or two rooms, and a hut for the natives. The herders often sleep in little huts attached to their sheep kraals.

The farm has boundary fences, and in some cases there are paddocks with vermin-proof fences subdividing the feeding areas. Each paddock accommodates about 500 sheep. The pasture is almost entirely of the little gray-green Karroo bushes, sometimes mixed with grass. The scattered hills usually provide the only shelter. There are one or two springs used for irrigating a few acres of lucerne or oats. Most of the water is provided from dams or from windmills working over bore holes.

When the paddock system is not used, and unfortunately this is very often, the homestead will have near it a few kraals, built of stone and mud. Native boys drive the sheep out of the kraals in the morning, herd them through the day, and drive them back at night. One herdsman can care for from 500 to 1,000 sheep. The sheep sleep in these kraals. Under these unsatisfactory conditions disease breeds and the wool becomes discolored and dirty.

Kraaling and herding are necessitated by the presence of animal pests, mostly jackals. The paddock system is slowly displacing the use of the kraals, and as these paddocks are securely fenced against jackals, the sheep can live outside day and night, the year round, in this section, and no herding is necessary. Because of smaller losses from pests and disease, less fretting of the flocks, and better wool, this system yields from 100 to 150 per cent higher returns than the old system. In some cases a little winter feeding is done, but because of the rigors of the climate—scorching heat and chilling winds on alternate days, months of drought, broken by a few days of tempestuous rains—the regions probably never will pass much beyond the pioneer stage of development. At any rate, no such fine stock farms will be found here for years to come as the one located 100 miles east of the Karroo.

Cost of Establishing Sheep Farms.

In order to determine the cost of establishing a good sheep station in the Union, representatives of the Commission interviewed a number of men on the subject. Space is not available for reproducing more than one estimate in detail. The one given below was made by Mr. George Minnaar, a leading sheepman in the Union, and represents a good establishment in the Midlands of the Cape Province, running 6,000 sheep.

INVESTMENT ITEMS.

(*a*) Stock:		
Sheep—		
5,910 ordinary ewes, at $5		$ 29,500
90 flock rams, at $15		1,350
2 good horses, at $50		100
4 teams trek oxen (14 to a team—56 oxen), at $60		3,360
Barnyard animals		250
(*b*) Fencing:		
Jackal fencing material and labor, 37 miles, at $725		26,825
Paddock fencing, 40 miles, at $290		11,600
(*c*) Houses, sheds, etc.:		
Dwelling house		3,000
Barn or shed holding 1,500 sheep		1,500
Stable, place for shearing and storing feed		2,500
(*d*) Bore holes, for 6,000 sheep at least 10 paddocks. These, if arranged rightly, would require 3 bore holes:		
To bore 150 feet, at $2.40	$360	
Windmill including pipe	485	
Cost of erecting 3 bore holes	25	
	870	2,610
(*e*) Other equipment:		
Dipping tank		480
Two wagons, at $480		960
Two double furrow plows, at $50		100
Outfitting wagons, at $40		80
Mower		175
Hay rake		85
Tools of various kinds		45
Total investment (excluding land)		84,570
If the land is owned, additional investment for 15,000 acres at $10 per acre		150,000
Total		234,570

It must be emphasized that this estimate represents conditions in but one locality of the Union and that it applies only to the better sort of farms. The average investment for carrying 6,000 sheep in the Union as a whole would, no doubt, be considerably less.

COST OF PRODUCTION.

In order to obtain information on the cost of running sheep in the Union, representatives of the Commission secured 12 cost schedules from flockmasters in various parts of the country. In the

nature of the case these reports are from the most progressive farmers, because the rank and file of flockmasters do not keep cost records. This point must not be forgotten in any interpretation of the figures. The costs are probably higher than the average for the Union, but the greater expense incurred results in a better quality of wool and smaller losses of sheep, and therefore the net profit per head is presumably higher than the average.

The results of these cost studies are presented below in Tables LXII, LXIII, and LXIV. Each table is subdivided for the purpose of distinguishing ordinary flocks from blooded or stud stock.

TABLE LXII.—*Investments per head of sheep.*

[The Sheep Industry: Union of South Africa, 1918.]

AVERAGE FARMS.

Company.	Land.	Equipment and improvement.	Sheep.	Total.
No. 1	$24.24	$3.98	$8.97	$37.20
No. 2	32.06	12.34	4.28	48.68
No. 3	42.33	5.58	8.86	56.79
No. 4	39.47	5.16	8.88	53.52
No. 5	23.43	19.32	7.92	50.69
No. 6	35.97	22.29	9.81	68.09
No. 7	34.24	14.92	6.03	55.20
No. 8	17.36	4.31	8.88	30.56
Average	29.71	9.46	8.36	47.53

STUD FARMS.

No. 9	$48.36	$16.72	$38.25	$103.34
No. 10	44.81	18.27	51.36	114.46
No. 11	29.56	26.37	57.94	113.89
No. 12	54.23	17.98	13.82	86.04
Average	43.91	20.25	38.79	102.96

TABLE LXIII.—*Receipts, expenses, and profits per head of sheep.*

[The Sheep Industry: Union of South Africa, 1918.]

AVERAGE FARMS.

Company.	Number of sheep.	Pounds of wool per head of sheep.	Total receipts per head of sheep.	Total expenses per head of sheep.		Profit per head of sheep.	
				Excluding interest.	Including interest.[a]	Excluding interest.	Including interest.[a]
No. 1	10,825	6.28	$5.83	$3.20	$5.44	$2.62	[b]$0.39
No. 2	1,770	4.24	2.60	1.21	4.14	1.38	[b]1.53
No. 3	1,800	8.00	4.50	1.63	5.04	2.87	[b].53
No. 4	1,800	8.00	4.47	1.04	4.25	3.43	.22
No. 5	1,213	4.95	2.81	2.90	5.94	[b].08	[b]3.12
No. 6	3,670	7.84	12.49	.91	5.00	11.57	7.49
No. 7	2,838	9.66	7.59	2.63	5.95	4.95	1.64
No. 8	1,102	7.00	4.43	1.33	3.16	3.10	1.27
Average	[c]25,018	6.76	6.25	2.17	5.02	4.08	1.22

[a] Indicates interest at 6 per cent on the State's value of range and farm land, sheep and equipment.
[b] Loss.
[c] Total.

TABLE LXIII.—*Receipts, expenses, and profits per head of sheep*—Continued.

STUD FARMS.

No. 9	4,906	.....	$7.66	$3.07	$9.27	$4.60	[b] $1.39
No. 10	2,711	.....	6.75	2.05	8.92	4.69	[b] 2.17
No. 11	5,850	7.86	15.20	5.54	12.38	9.65	2.82
No. 12	5,753	8.07	9.27	6.43	11.60	2.83	[b] 2.32
Average	[c] 19,220	7.96	10.31	4.69	10.86	5.62	[b] .55

[b] Loss. [c] Total.

TABLE LXIV.—*Details of cost per head of sheep.*

[The Sheep Industry: Union of South Africa, 1918.]

AVERAGE FARMS.

Company.	Number of sheep.	Labor.	Feed.	Shearing.	Decrease in inventory.	All other.	Total.	Imputed interest on investment.	Total expenses, including interest.
No. 1	10,825	$1.16	$1.16	$0.21	$0.45	$0.21	$3.20	$2.23	$5.44
No. 2	1,770	.73	.....	.09	.....	.38	1.21	2.92	4.14
No. 3	1,800	.86	.45	.07	.....	.24	1.63	3.40	5.04
No. 4	1,800	.32	.40	.06	.....	.25	1.04	3.21	4.25
No. 5	1,213	.34	2.40	.06	.....	.10	2.90	3.04	5.94
No. 6	3,670	.14	.26	.17	.....	.33	.91	4.08	5.00
No. 7	2,838	.53	.06	.23	.56	1.23	2.63	3.31	5.95
No. 8	1,102	.52	.08	.20	.....	.51	1.33	1.83	3.16
Average	[a] 25,018	.76	.73	.17	[b] .13	.37	2.17	2.85	5.02

STUD FARMS.

No. 9	4,906	$0.65	$0.61	$0.30	.....	$1.49	$3.07	$6.20	$9.27
No. 10	2,711	.35	.48	.14	.....	1.06	2.05	6.86	8.92
No. 11	5,850	.57	.49	.19	$1.24	3.03	5.54	6.83	12.38
No. 12	5,753	.90	.76	.14	2.75	1.87	6.43	5.16	11.60
Average	[a] 19,220	.66	.60	.19	[b] 1.20	2.01	4.69	6.17	10.86

[a] Total.
[b] The average decrease in inventory per head is the average decrease for all companies rather than for the individual company.

Table LXII shows the difference between ordinary and stud flocks in all classes of investment. The land investment averages less than $30 per head of sheep for the eight ordinary flocks as compared with about $44 per head for stud stock. Equipment averages nearly $9.50 per head for the former and over $20 for the latter. The average value of ordinary sheep is $8.35 each and of stud stock around $39. The total investment per head is $47.50 and $103, respectively, for the two kinds of flocks.

A similar difference is shown in Table LXIII. The clip for the eight flocks averages 6¾ pounds and for the stud stock about 8 pounds per head. Receipts average $6.25 per head for the former and $10.30 for the latter. Expenses, excluding interest on the investment, are $2.17 and $4 69, respectively, for the two classes of sheep. Net profits are $4.08 and $5.62, excluding interest in both cases.

A different situation develops when interest on the total investment is included in cost. In each case the interest at 6 per cent on the total investment is larger than all other items of expense. The cost of running ordinary flocks is increased from $2.17 to $5.02 per head when interest is included, and of stud stock from $4.69 to $10.86. Net profits are reduced to $1.22 per head in the eight flocks and an average net loss of 55 cents is shown for the four stud flocks. In fact, three out of the four of these flocks show a heavy loss per head if imputed interest is included in cost, and four out of the eight ordinary flocks show a loss under these conditions.

In Table LXIV are presented some of the details of expenses. The averaged cost for labor and feed is lower for stud stock than for ordinary sheep. Reference to the details will show, however, that the labor and feed bills for Company No. 1, and the feed bill for Company No. 5, largely account for this anomalous situation. Company No. 1 is in the Transvaal where it is necessary to trek the sheep nearly 150 miles back and forth to the winter range. Five weeks are necessary each way for this drive and 4 white men and 30 natives are required to handle the numerous bands; labor cost therefore is high. The feed bill for Company No. 5 is large because the amount of oats and alfalfa, consumed either as pasturage or for winter feeding, is reckoned at the market price which was high on account of the drought.

The column marked "decrease in inventory" requires some comment. The number of sheep at the beginning and end of the year were determined, and by applying the same unit value for both periods the decrease in inventory value due to changes in numbers alone was obtained; that is to say, arbitrary values per head were eliminated from the calculation. In case there was an increase in the inventory during the year it was included in receipts. If a decrease, it was charged to expenses as shown in this table. For the ordinary flocks the average decrease for all was only 13 cents per head, but for the four stud flocks the item is considerable—an average of $1.20 per head. This charge, together with the expenses included in the column marked "all other," accounts for much of the increased expense of running stud stock. These "all other" expenses are in the nature of "overhead"—managerial salaries and numerous other items which are specially incurred in raising fine stock. Again attention is called to the column of imputed interest, $2.85 per head for the ordinary sheep as compared with $2.17 for actual expenses, and $6.17 per head for the stud flocks as compared with $4.69 for expenses.

Inasmuch as the stud flocks show a loss when interest on the investment is included, the conclusion may be drawn that it does not pay to run such sheep. This conclusion is not assured, however,

when based upon the problem of interest alone, because in the long run it necessarily follows that, as the net profits increase from the operation of the farm, the value of the capital assets will increase in like proportion, and no matter how high the profits per head may become, the value of the sheep and land will increase to such an extent that only 6 to 7 per cent is earned on the investment.

DISEASES AND PESTS.

Sheep scab is a serious problem in the grazing districts of South Africa. The disease spreads rapidly and is not obvious for some time after infection. This fact, together with the character of the country, the large tracts of land to be inspected, and the indifference of careless flock owners, makes control very difficult. As a rule, the proportion of infected flocks is kept below 2 per cent of the total, though a much higher percentage is often under quarantine.[6]

Eradication of scab is now under government supervision, and regulations in regard to it are very stringent. The methods used for destruction, usually an arsenical dip, are very effective, but great vigilance is required to enforce the dipping regulations. The Union is divided into 360 districts, each with an inspector who inspects from time to time all the sheep in his district and who attends personally to the dipping of infected flocks. All such flocks are placed under quarantine and are not allowed to be moved until the sheep are certified as free from scab. Heavy fines, running as high as $950, are imposed upon owners for failing to report the presence of scab in the flock or for shifting sheep when infected.

"Protected areas" have been established which are free from scab and large enough to warrant strict enforcement of the regulations without unduly hampering the movement of the sheep. These districts have been enlarged from time to time by the addition of adjoining areas that have been cleared of the disease, with the result that the greater portion of eastern Cape Province, considerable areas in Orange Free State, and two in the Transvaal were protected or semi-protected districts in 1918.

Under careful supervision and with increasing cooperation on the part of the farmers, flocks affected with scab have been decreasing. In 1919, however, the severe drought weakened the flocks to such an extent that dipping was inadvisable in many cases and scab has appeared more frequently.

The cost of dipping a flock of 5,000 sheep, including interest on tank construction, labor, and dip, is about 4 cents per head for two dippings. Progressive farmers dip at least once a year even when

[6] South African Journal of Industries, July, 1919.

their flocks are free from the disease. This is a preventive against lice, keds, and other parasitic troubles, as well as against scab.

Wireworm often causes heavy mortality among sheep and goats. This parasite is a blood sucker and the infected animal becomes anemic, and therefore has less vitality to resist drought conditions where there is great shortage of feed. Infection of this sort is caused almost entirely by contaminated drinking water. The remedy is a solution of sulphate of copper or bluestone, but removal of the cause is much more effective.

Bluetongue, a malarialike fever caused by a parasite in the blood, is another disease which causes severe losses, especially among the flocks of small farmers. The flocks of progressive farmers suffer little from this disease because it is preventable by inoculation.

All of these diseases are much less prevalent in dry regions and losses are always greater during a wet season. According to Union statistics a total loss from disease of 1,470,911 head of sheep occurred in the season of 1910–11, or about 4.8 per cent of the total. Losses of 2,234,723 occurred in 1917–18, or nearly 7½ per cent of the total. The losses of some individual farmers are necessarily much larger than these percentages; in some seasons whole districts are sorely beset.[7]

The pests that are most annoying to the South African sheep farmer are the jackal, a lynx called the rooikat, and the baboon. Jackals are troublesome in the Cape Province and the Orange Free State, but are not found to any great extent in Natal, Zululand, East Griqualand, or the Transvaal. There is one species of jackal, or fox, which will kill a sheep for food; another kind will slay as many as 30 in a single night. The only effective way of keeping these pests away is by inclosing the farm with jackal-proof fencing. Such a fence is about 5 feet in height, 4 feet of which consists of mesh wire. About 1 foot of the mesh lies on the ground also and is kept in place by stones. Above this wire netting, barbed wire is strung in rows 5 inches apart. In addition to this, the top of the fence has a 1-foot "veranda," set at an angle of 45° on which are strung more barbed wires. This fencing is expensive, costing now about $775 per mile, but progressive farmers find that the expenditure is well worth while. When the farm is not fenced, the sheep must be kraaled at night, with a resulting loss not only from dirty wool, but from fretted flocks and disease contracted in the crowded and dirty pens.

In some districts the farmers have instituted hunt clubs, which meet once a month or oftener for the purpose of exterminating jackals. Any member may keep a dog without paying a dog tax. In most plans the Divisional Councils offer a bounty of $2.40 per

[7] Supplement to Half Yearly Abstract of Union Statistics, June, 1919.

head for jackals. Some also offer bounties for lynxes and baboons. In addition, the hunt clubs usually offer extra bounties.

Lynxes are not so common as jackals, but are troublesome in the same way. The number of both is decreasing.

Only in very warm, dry seasons are baboons much of a pest to sheep farmers. Then, desperate for lack of food on account of the drought, they come down to the farms and kill a great many of the young lambs. Fences prove ineffective as a means of keeping them out, because they can climb any fence.

No figures are available to indicate the losses from predatory animals, nor the annual cost of fighting them, but that these are considerable items may be judged by the expensiveness of jackal fencing. Some estates in the Union running five or six thousand sheep have as much as 50 miles of this fencing, costing, under present conditions, over $700 a mile, or a total investment of $30,000 or $40,000. That is to say, the fencing against pests often costs considerably more than the sheep themselves.

MARKETING AND PRICES.

After the wool is baled it is sent by wagon and ox teams to the nearest railroad station, usually 20 or 30 miles away. These wagons carry about 8,000 pounds each, and the cost of hauling is about 37 cents per hundred pounds for 25 miles. The wool goes by rail to the nearest port, principally to Cape Town and Port Elizabeth, at a charge of about 1 cent per pound for each 500 miles.

In normal times about 60 per cent of the wool growers in South Africa sell their wool to local merchants. In most cases this results in a system of barter, the farmer handing over his clip as a payment on account for supplies used during the year, and receiving whatever the merchant sees fit to give him. Usually the buyer in such cases is not competent to judge the yield of the clip, but simply buys at so much per pound in the grease irrespective of quality or condition. He then resells to a wool broker and his profit is often greater than that of the farmer.

The other 40 per cent of the growers sell on the commission basis, usually through private brokers. The brokers advance to the farmers 80 per cent of the value of the wool and charge a brokerage fee of 2 per cent. About 25 cents a bale is charged for receiving, weighing, and lotting the wool. The system of private dealing is carried on at Cape Town and East London. At Port Elizabeth a little less than one-fourth of the wool sent in is sold at public auction sales conducted by the Municipality. At Mossel Bay, municipal catalogue sales are held once a year. All of these are Cape ports. At Durban, in Natal, there are two organizations, one of wool buyers and one of

wool brokers, and it is agreed that all wool must first be put up at public auction, though it may be sold otherwise under certain conditions in case a certain amount is not realized on it. Efforts are being made to bring about more uniformity in grading, in dealing as to both buying and selling, and in pricing the wool. Up to this time there is no effective organization among growers, and methods of marketing are largely haphazard.

At Durban, under favorable circumstances, the wool is catalogued and arranged for sale in a large, well-lighted warehouse. For three days before the sale it is on inspection for the buyers. On the day of the sale the wool is auctioned off by catalogue to representatives of manufacturers or to dealers. The buyer pays shipping and pressing charges but is allowed free insurance for 30 days.

Most of the South African wool is shipped in the grease, though more is now scoured than formerly. In 1913, 2.1 per cent of the wool exported was scoured. In 1919 this proportion had risen to 14.3 per cent. Most of the wool washing is done in Cape Town and Port Elizabeth. The wool is usually dried in the sun; the finished product is thus made sweet and clean even though the method is slow.

Distribution of South African Wool.

Before the recent war the United Kingdom and Germany took practically all of the wool exports. Since then there has been a radical change in the markets. In 1917 and 1918 the United States took about 50 per cent of the exports and Japan took over 25 per cent. While Table LXV shows countries of destination for wool exports; it is of doubtful value as an indication for the future course of trade.

TABLE LXV.—*Wool exports of South Africa, by country of destination.*[a]

[Grease basis.]

Destination.	1913	1914	1915	1916	1917	1918	1919
	Pounds.	*Pounds.*	*Pounds.*	*Pounds.*	*Pounds.*	*Pounds.*	*Pounds.*
United Kingdom	98,028,787	88,725,601	133,803,833	107,537,602	23,313,704	35,809,838	96,462,208
Per cent of total	52.21	62.36	71.84	68.96	16.67	24.88	41.67
Dominion of Canada			32,876	39,415	632,917	4,149,416	958,322
Belgium	20,605,225	10,717,603					12,662,059
France	4,898,212	1,969,741			59,800	261,652	9,588,482
Germany	61,123,713	39,602,452					
Holland	786						572,876
Italy	924,852		309,150			1,528,199	43,002
Russia	2,983	15,037					
Portuguese East Africa	1,345						
Japan			16,286	83,195	39,307,475	30,878,226	39,800,648
United States of America	221,522	1,229,133	52,091,137	48,235,842	76,530,988	70,989,978	71,502,522
Per cent of total	0.12	0.86	27.97	30.94	54.72	49.31	30.87
Argentina						324,365	
Falkland Islands							1,067
Total	183,897,355	142,259,567	186,253,252	155,896,055	139,844,884	143,942,704	231,591,151

[a] Enslin, B. G. L.: The Wool Industry, Union of South Africa. Department of Agriculture, Bulletin No. 4, 1920, p. 19.

Although the quantities of South African wool exported to the United Kingdom in 1913 and 1919 were almost exactly the same, yet the percentage of total exports to the United Kingdom in the former year was 52, as compared with 41 in 1919. Relatively little wool went to England in 1917 and 1918 from the Union, 16 and 25 per cent, respectively, for the two years. On the other hand, the exports to the United States rose from less than 1 per cent in 1913 and 1914 to 54 per cent in 1917, 49 per cent in 1918, and about 31 per cent in 1919.

No figures from the Union are available for the exports of wool to this country in 1920, but from other sources the imports into the United States of South African wool are found to be over 42,000,000 pounds for the year ending June 30, 1920,[8] or, roughly, 25 per cent of the total clip in normal years.

The figures for the United States, however, are not so conclusive in showing the drift of international trade as this table seems to indicate, because the figures are for direct shipments only and do not include the South African wool sent to England and reexported to this country before the war. These reexports were probably not large, but to the extent that they occurred, the table is misleading. A further point to be considered in interpreting this table is the fact that the African purchases by the United States do not represent the increased consumption of foreign wool by this country, but merely a substitution of South African for Australian wools. The Australian supply was rigidly held by the Imperial Government, whereas the South African market was opened both to the United States and Japan.

Marketing During the War.

The 1916 wool clip was sold at auction to American and Japanese buyers. The entire wool clips of Australia and New Zealand had been requisitioned by the Imperial Government in December, 1916, but free export had been permitted for South Africa. In the spring of 1917, the Imperial Government offered to buy the whole of the South African clip produced from August 1, 1917, to August 1, 1918, on the same price basis as that offered Australia, i. e., 55 per cent above the average 1913–14 prices. Early in October, 1917, the British Government offered to buy all wool registered for sale by the 31st of October. Only a minority of the growers accepted this offer. A total of 190,669 bales, or about one-third of the total clip, was submitted. In January, 1918, growers whose wool had not already been shipped were permitted to withdraw their offerings. So long as there seemed to be a possibility of the entire South African clip

[8] Foreign Commerce and Navigation of the United States, 1920.

being purchased by the Government, Japanese buyers, since they were cut off from purchases in Australia and New Zealand, were very active and bought large quantities at almost any price. But as soon as it was understood that sales to the Imperial Government were optional, Japanese orders were greatly reduced and buying was almost entirely confined to the long wools.

As a result large quantities of South African wool awaited shipment, and in the fall of 1918 the growers, still far from united in their feeling, asked the Union Government to appeal for aid to the Imperial Government. The request was made for a greater advance than 55 per cent over 1913–14 prices on the ground that during the intervening five years the quality of South African wool had more nearly approached that of Australian wool. Certain concessions were made, but before any final agreement was reached the armistice was signed. In December, 1918, the Imperial Government offered to buy at the amended prices in case at least 200,000 bales were registered for sale. This was objected to by the Union Government on the ground that it would be impossible to reach so large an amount, and knowing this farmers would refuse to register. The number of bales was reduced to 150,000, the Imperial Government making it clear that this offer was made only at the request of the South African Government and to meet the expectations of the South African people. The growers refused this offer and the wool was sold on the open market.

The following table gives the prices offered by the Imperial Government for the 1917–18 and 1918–19 clips, as recommended by the Central Wool Committee of the Union Government. The prices for 1913–14 were calculated from these, the 1918–19 prices being 55 per cent in advance of the prewar prices.

TABLE LXVI.—*Prices offered by Imperial Government for South African wools.*

[Grease basis.]

Type of wool.	Price per pound.		Type of wool.	Price per pound.	
	1913–14	1918–19		1913–14	1918–19
Choice superfine sound combing	$0.2598	$0.4027	Inferior shorts	$0.1340	$0.2077
Superfine sound combing	.2355	.3650	Native super	.1745	.2705
Extra super combing	.2273	.3523	Native medium	.1624	.2517
Super combing	.2091	.3241	Native inferior	.1441	.2233
Good average combing	.1908	.2957	Bellies and good pieces, combing	.1705	.2643
Average combing	.1786	.2768	Bellies, mixed	.1461	.2264
Inferior combing	.1664	.2579	Locks and second pieces	.1218	.1888
Extra super medium	.1989	.3083	Super white coarse, grease	.1573	.2438
Super medium	.1827	.2832	Average white coarse, grease	.1319	.2044
Average medium	.1685	.2612	Inferior white coarse, grease	.1015	.1573
Inferior medium	.1543	.2392	Superior coarse and colored, grease	.1319	.2044
Choice superfine shorts	.1949	.3021	Average coarse and colored, grease	.1116	.1730
Superfine shorts	.1786	.2768	Inferior coarse and colored, kempy grease	.0913	.1415
Good bulky shorts	.1745	.2705			
Average shorts	.1624	.2517			

British purchases at the prices given in Table LXVI of South African wool amounted to about one-quarter of the 1917–18 clip. The actual average price of wool so purchased was $0.2775 per pound for the Union as a whole. The average price of wool in the grease on the open market and exported up to July 31, 1918, was $0.3556—a difference of nearly 8 cents per pound—but the price realized on Government purchases (27¾ cents) went directly to the growers, whereas the open-market quotation represents the final price at the port after several profits had been taken by middle men.

Further indications of the drift in South African prices on the open market are given in the following table of average export values since 1910:

TABLE LXVII.—*Average value per pound of South African wool exports.*[a]

1910	$0.1522	1916	$0.2334
1911	.1421	1917	.3552
1912	.1421	1918	.3958
1913	.1522	1919	.4617
1914	.1522	First three months of 1920	[b].7620
1915	.1522		

[a] Trade Supplement to London Times, May 22, 1920, p. 254.

[b] Quoted from the Cape Times by the U. S. Commerce Reports, July 27, 1920, p. 524.

It will be seen that prices for 1919 were, roughly, three times the normal prewar quotations, and for the first quarter of 1920 they were at least five times the prewar prices. This extraordinary price brought out immense quantities of wool from storage. According to the Cape Times, quoted by the United States Commerce Reports, there were shipped in the first three months of 1920 about 68,000,000 pounds of wool, as compared with only 37,000,000 pounds in the first three months of 1919.[a] Moreover, the value of the exports for the first quarter of this year (1920) were nearly double the value of the total wool exports for the 12 months preceding the war.

From these figures it is evident that the sheep farmers of the Union are prosperous and that in the absence of disturbing factors wool growing will spread rapidly. The recent world-wide fall in the wool market has affected the Union, however, and what the final result will be for the whole year of 1920 is uncertain. Upon this point Vice Consul Charles J. Pisar, of Cape Town, writes as follows:

For the past four months the wool market at Port Elizabeth has been practically at a standstill. The public markets were discontinued, as the regular operators were without orders. At Durban the market has been inactive for a longer period. Only isolated transactions have been recorded at East London.

Toward the end of August the public market at Port Elizabeth was reopened, although there is little evidence of orders from foreign sources. A small

[a] U. S. Commerce Reports, July 27, p. 524.

amount of speculative buying in short wools has taken place, but not sufficient to affect prices. A quantity of good average 12 months' wool was sold at prices ranging from 28 to 36 cents a pound.[10]

The United States Bureau of Markets estimates that on September 1, 1920, the total wool in storage in the Union was 57,188,000 pounds,[11] whereas in normal times the warehouses are empty at this date in preparation for the new clip arriving in October. This figure represents a little less than 35 per cent of a normal clip for the Union, estimated at 167,000,000 pounds.

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[10] U. S. Commerce Reports, Nov. 8, 1920, p. 624.
[11] The Market Reporter, U. S. Department of Agriculture, Oct. 2, 1920.

CHAPTER 15.

WOOL GROWING IN NEW ZEALAND.

SUMMARY.

The situation of New Zealand renders its climate singularly equable with respect to both temperature and rainfall. The high mountain ranges, especially in South Island, cause excessive rainfall in some sections and droughts in others, and also bring about sudden changes in temperature; but on the whole the climate is favorable for live stock, and green forage is plentiful all the year round. No winter feeding is necessary for range stock over most of the territory and only a few weeks of market feeding are required to produce fat stock.

Sheep raising has been the dominant industry in the islands since their settlement. Although the Dominion occupies an area equal to about one-thirtieth that of the United States, it has about half as many sheep as this country (about 25,000,000 compared with 48,000,000 in the United States), about as many as Great Britain, one-third as many as Australia, half as many as Argentina, and twice as many as Germany and France combined.

Moreover, the number of sheep is increasing, or at least no decline has definitely set in as in most of the other countries of the world. There is practically no competition from grain crops, wheat, and oats. The only industry which may become a serious rival to the sheep industry in the near future is dairying. Because of the enormous increase in land values in the dairying districts sheep raising may tend to become unprofitable. The exports of butter and cheese in 1918 were almost exactly equal in value to that of wool—about £7,500,000. In previous years, however, the value of butter and cheese exports were about one-half that of wool. The export value of mutton and lambs is in turn about half that of dairy products. That is to say, from 1915 to 1917, inclusive, exports of wool were roughly £12,000,000; of butter and cheese, £6,000,000; and of mutton and lambs, £3,000,000 annually.

An important problem for the flockmasters is the land situation. Large holdings are now being broken up not only by ordinary

economic forces but also by law. Pioneer conditions are past; and the era of medium-sized flocks, carefully and scientifically bred, but still managed under the conditions of a pastoral industry, has also reached its zenith; and the third stage, namely, farm conditions, under which a small flock is kept by relatively small farmers, is now developing.

The qualities of wool and the purity of types usually suffer somewhat as a result of small-scale operations, and although the number of sheep may increase with the increase of intensive agriculture, yet the unit cost of sheep products is likely also to increase. Therefore New Zealand probably will never be more important than she now is as a sheep-raising country.

One check to higher costs is the fact that much of the pastoral areas is held on long-term leases, running from 25 to 99 years, and the rentals have been little, if any, affected by the war. In the course of time these rents will increase as leases are renewed, but not to any considerable extent in the present generation. But, although these low rentals give an advantage to the lessee, they do not necessarily benefit the sheep industry as such, because, to the extent that cattle or other live stock can be run on leased land, the competition of alternate uses is just as strong and will tend to drive out the sheep just as effectually as if the land were owned in fee simple.

Unlike many other countries, New Zealand can not meet the rising price of land by turning more to the mutton type of sheep, because, with the exception of Great Britain, she has already gone farther than any other country along this line. Romneys, Lincolns, Leicesters, and Corriedales are the dominant types, and a further decrease of Merino blood probably would cause a greater loss in wool values than would be gained from better mutton. Shropshires are gaining ground in Canterbury, where the small plump lamb is at a premium, but over the islands as a whole the balance between wool and mutton is nicely adjusted.

The war affected New Zealand industries less than those of the United States. Prices for New Zealand wool were fixed early in the war at about 30 cents per pound (55 per cent above the 1913–14 prices) and for live sheep at from 7 to 10 cents per pound. American prices were 50 to 60 cents for wool and 12 to 15 cents for sheep. Food prices in the islands increased from 1914 to 1918, inclusive, from 45 to 50 per cent, as compared with an increase for the same period of 80 to 100 per cent in this country. Wages in general rose about 16 per cent in the Dominion and about 50 per cent in the United States. Taken all together, the purchasing power of sheep products in terms of other commodities was greater in the United States than in New Zealand.

Recently, however, conditions have changed considerably, in large part on account of the abandonment of control by the Government. Until July, 1920, prices of many commodities were held down by the terms of the imperial contract, but in anticipation of that date, the quotations rose sharply as the world markets became available. There was mad speculation, especially in the land values, which sometimes rose several hundred per cent, and general industrial conditions now appear to be almost as disturbed in New Zealand as in other countries.

During the latter part of the war shipping was not available for most of the wool and mutton purchased in the islands and they were stored under Government control. In normal times about 3,000,000 carcasses of lamb are annually exported, but only 916,000 were shipped in 1919. As a result of this storage New Zealand mutton is now seeking markets wherever prices are favorable. Practically all mutton and lamb of the islands go to England in normal times, but from April to October, 1920, there arrived in the United States something over 1,500,000 carcasses of New Zealand lamb, weighing over 50,000,000 pounds, or an amount roughly equal to one-half of the average exports in normal times from the Dominion to all parts of the world.

Much wool is yet stored subject to the call of the British Government. Usually by the end of August the warehouses of the islands are empty, but on September 1 of this year there were about 400,000 bales in storage or something less than a normal clip. The disposal of this excess wool and mutton is likely to cause a temporary disturbance in the world markets for these products and may entail a considerable loss to sheep growers in other countries. This is a temporary situation, however, similar to that existing in all other wool-producing countries of the world, and in the long run New Zealand probably will not reach a more important position relative to other wool districts than she now occupies.

PHYSIOGRAPHICAL FEATURES.

The Dominion of New Zealand is composed of a number of islands, but the two main ones—North and South Islands, as they are called—constitute nearly all of the land area. Each island is about 500 miles long with an average width of less than 100 miles. The area of the two is almost exactly that of the State of Colorado and considerably larger than the island of Great Britain.[1] The climate both with respect to temperature and rainfall is much like that of the western coast States of the United States.

[1] Area of the Dominion proper (excluding some small islands annexed in 1901) is 103,581 square miles. The area of Colorado is 103,948 square miles and that of Great Britain is 89,047 square miles.

The physiographical center of North Island is a group of volcanoes, some of which rise to an altitude of 8,000 and 9,000 feet, and from which spurs, often as high as 4,000 feet, reach out to the remote parts of the island. From these spurs rough hills spread out over the country, with the result that relatively little area is left for intensive agriculture, or at least for grain crops. There are, indeed, two or three fertile plains facing the sea, especially on the northeast coast, but portions of these are covered with pumice and other volcanic remains which render them less fertile than similar plains in Australia or other countries. Some of the plains are low and marshy and much reclamation work is necessary before they are fit for agriculture. Almost the whole island was originally covered with forests, but in the last half century these have been burned off and prodigally destroyed. Over the rough, denuded, often dangerously steep hills, grasses—chiefly English sown grasses—have gained a foothold, with the result that rich pasturage for both sheep and cattle is available the whole year around.

The chief physiographical feature of South Island is the backbone of mountains which runs its full length north and south. This range—the Southern Alps—clings to the western coast in the north and central regions but spreads out over most of the southern portion of the island. Many peaks are from 10,000 to 12,000 feet high and because of their latitude are covered with perpetual snow to a relatively low level. East of this rugged range the country slopes first into a region of rough foothills and then into the level plains of Canterbury on the east coast. The hills and plains of Canterbury (east central portion of South Island) are almost unsurpassed for grazing purposes and furnish some of the best wool and mutton in the world.

Taking the two islands together, out of a total area of about 66,000,000 acres it is estimated that about 28,000,000[2] are, or can be made useful for agriculture; about 28,000,000 for pasturage only; and that about 10,000,000 acres are completely barren.[3]

CLIMATE AND RAINFALL.

The dominant factors in the climate of New Zealand are its situation in the heart of the southern Pacific and the lofty mountain barrier on the west coast, especially of South Island, which intercepts the prevailing westerly winds. This combination of ocean winds (the remote interior is only 50 to 75 miles from the sea) and high mountain ranges results in the curious fact that although the average

[2] It is not to be assumed that these figures for agriculture and pastoral land represent the amount actually in use. As a matter of fact, much of these areas is heavily wooded or is marshy and could be productive only after considerable expenditures of money.

[3] New Zealand Official Yearbook, 1907, pp. 9 and 13.

range of temperature between summer and winter is remarkably small[4] yet the changes in weather, as distinct from seasonal changes, are often violent and in some cases disastrous to live stock. Blustery winds are continually swirling about the mountains and sudden snowstorms occur far down their sides in summer and cover the foothills in winter. In spite of these sudden changes, however, the climate is equable as a whole, and the winds are invigorating.

The rainfall is plentiful over the islands as a whole, although some areas in the lee of the mountains occasionally suffer from drought. The annual average precipitation for the last half century is nearly 50 inches, but the variations from this mean are considerable both with respect to time and place. Hokitika, on the west of South Island, has an average rainfall of 116 inches (34 years) with 154 inches as a maximum and 88 inches as a minimum. On the other hand, Christchurch, on the opposite side of the island and only about 50 miles in a direct line, has an average fall of only 25 inches with 35 inches and 13 inches as the maximum and minimum, respectively, in 36 years.[5] Remote valleys, closer under the lee of the mountains, have a lower average even than Christchurch, but despite these extreme variations the Dominion is well watered and has a fairly even distribution through the seasons. Winter rains run from 12 to 15 inches, summer from 10 to 11 inches, and spring and autumn about halfway between these ranges for the 50-year average.

These climatic conditions have been given in some detail because they are of fundamental importance in any study of the pastoral industry of the islands. A plentiful and regular rainfall and a relatively small average variation in temperature between winter and summer account for a flourishing pastoral vegetation in spite of a rough surface and thin soil as compared with the plains of the United States.

More important still for pastoral purposes and for international comparisons in the sheep industry are the small seasonal variations with respect to temperature and rainfall, that over much of the area make winter feeding unnecessary for the range flocks. Even in South Island, where the winters are sometimes severe, the sheltered valleys usually furnish forage for the sheep when the snow covers the summer range. It is true that large forage crops are raised, but these are fed chiefly to the mutton stock by way of topping off for the market, and no such elaborate investments in the form of sheds and winter feed occur in New Zealand as are necessary in parts of the United States.

[4] Wellington, with a mean annual temperature of about 55°, has an average range between July and January of only about 16°, whereas Washington, with almost exactly the same annual mean, has an average variation of over 45° between July and January. New Zealand Official Yearbook, 1913, p. 37.

[5] New Zealand Official Yearbook, 1913, p. 38.

IMPORTANCE OF THE SHEEP INDUSTRY IN NEW ZEALAND.

Sheep raising has been the dominant industry of New Zealand since the settlement of the islands by white men three quarters of a century ago. As early at 1858 there were more than a million and a half sheep in the country, and by 1875 there were about 10,000,000 head, or nearly half the number at the present time. Although the whole Dominion is only about the size of the State of Colorado,[6] it has about half as many sheep as the United States, nearly a third as many as Australia, and more than half as many as Argentina.

A further interesting comparison is that of the number of sheep per capita of population. New Zealand has 23 sheep per capita as compared with about 17 in Australia, less than 10 for Argentina, about 5½ for British South Africa, something over 0.5 for the United Kingdom, and less than 0.5 per capita for the United States.[7]

Another important comparison is that of the sheep industry with other agricultural pursuits in the Dominion. Table LXVIII brings out this comparison since 1861 for live stock and since 1891 for wheat.

TABLE LXVIII.—*Production of agricultural and pastoral products in New Zealand.*[a]

(000 omitted.)

Year.	Sheep.	Cattle.	Pigs.	Wheat.	Oats.	Acres under cultivation.[b]
				Bushels.	*Bushels.*	
1861	2,761	198	43	.....	.....	226
1867	8,419	312	115	.....	.....	677
1871	9,701	437	151	.....	.....	1,226
1878	13,069	578	207	.....	.....	3,963
1881	12,190	699	200	.....	.....	5,189
1886	15,174	853	278	.....	.....	6,845
1891	16,754	832	309	5,724	[c] 9,894	8,893
1896	19,138	1,048	240	3,613	[c] 12,153	11,550
1901	20,233	1,257	251	8,581	[c] 21,761	13,064
1906	20,108	1,811	250	7,892	12,708	14,383
1911	23,996	2,020	349	8,661	10,119	16,154
1916	24,788	2,417	298	7,108	7,653	16,984
1917	25,270	2,575	284	5,083	5,371	17,062
1918	26,538	2,809	259	6,808	4,943	17,386
1919	25,829	3,035	235	6,567	6,885	17,613

[a] New Zealand Official Yearbook, 1918 and 1919.
[b] Includes all occupied land under crops.
[c] Figures are for years 1893, 1894, 1903.

Until recently both cattle and sheep have shown a steady increase, but the production of pigs reached its highest market some 30 years ago. Wheat and oats reached their peak about 1900 and have steadily declined since then. The total area under cultivation has increased in the last 20 years, but not at a rapid rate. Taken alto-

[6] New Zealand—Area, 103,000 square miles; population, 1916, 1,009,449. Colorado—Area, 103,948 square miles; population, 1920, 938,000.

[7] Statistics of Live Stock, etc. Report No. 109, U. S. Department of Agriculture, pp. 49–53.

gether, it is fairly clear that the sheep industry of the islands is not threatened by the spread of grain crops, but there may be some question of the future relative importance of the cattle industry, especially dairying, as possibly a competing industry.

In all countries cattle are likely to share the range with sheep, but often both have been diminished or a change from range to feed-lot methods has been caused by the advance of grain crops. In New Zealand dairy farming is in some measure threatening to supersede purely pastoral husbandry. All over the islands, especially in North Island, there are creameries fed by skimming stations which reach out into the remote districts for their supply of milk. How important dairy products are becoming as compared with wool is indicated by the following table of exports of these products. The actual production of butter and cheese is not available.

TABLE LXIX.—*Exports from New Zealand of sheep and dairy products.*
(000 omitted.)

Year.	Wool.		Mutton and lambs.		Butter and cheese.	
	Quantity.	Value.	Quantity.	Value.	Quantity.	Value.
	Pounds.		*Pounds.*		*Pounds.*	
1900	140,706	£4,749	.....	.....	27,543	£970
1905	139,913	5,381	156,911	.....	39,428	1,614
1910	204,369	8,308	193,247	£3,134	80,845	3,007
1915	196,570	10,388	236,508	5,968	122,740	5,431
1916	185,507	12,386	265,157	4,989	130,805	6,147
1917	178,274	12,175	206,726	3,833	114,015	6,081
1918	108,724	7,527	174,104	3,174	131,447	7,490

During the past 20 years the quantity of butter and cheese exported has increased nearly 500 per cent and the value has increased about 800 per cent as compared with an increase of about 35 per cent in the quantity of wool and about 58 per cent in its value. Moreover, the absolute value for dairy products is almost equal that of wool. To what extent dairying will spread over the great sheep-raising areas is necessarily an uncertain question but one which involves the whole future of the sheep and cattle industry of the islands.

LAND SITUATION.

The present land situation in New Zealand is the result of three-quarters of a century of struggle between large and small holders of real estate. The issue is probably still unsettled, but at the present time the large holdings are disintegrating under the usual economic forces incident to the growth of population and under pressure of direct legal action.

Prior to the formal assumption of sovereignty over the islands by Great Britain in 1840, land speculators had appropriated most of

the territory by paying nominal sums to the natives for indefinite areas bounded by such vague lines as "so far as the eye can see" and "between these rivers to their headwaters." When the Government assumed control most of these claims were not recognized, and for a time a limit was placed upon holdings, usually about 2,500 to 3,000 acres, and a price, about $1.25 per acre, was set as the cost of freehold land. Later the restrictions on the amount of purchases from the Crown were removed, but to offset the tendency toward large holdings the price was raised, being fixed in some cases at from $5 to $15 per acre. This price discouraged settlement and it was again cut to about $1.25 per acre, but no restrictions were reimposed on the size of holdings. Furthermore, at various periods the Government permitted speculators to deal directly with the natives with the result that vast tracts were preempted by relatively few men. After 1850 the growth of great estates continued, and by 1891, when there occurred the beginning of thorough land reforms in the islands, two-thirds of the whole Dominion was freehold, and two-thirds of this area, or nearly half of the occupied territory, was owned by less than 2,500 persons; over a million acres were owned by 50 absentee landlords. Only about one-tenth of the population was engaged in agriculture notwithstanding the obvious fitness of the country for that industry.[8] Moreover, the settlements were patchy and were wedged in between the great estates, and there were miles of wild country unavailable to the farmers.

Land Laws.

Against these intolerable conditions remedies were sought in the form of three land laws enacted in 1891 and 1892. One of these laws sought to break up the large holdings by a graduated tax on the value of the land, beginning with 5 cents and ending with 83 cents on the hundred dollars. Liberal exemptions were allowed for small holders and in actual practice only about 12,000 out of over 90,000 holders paid any tax.

Another bill sought to discourage large holdings by permitting a 999-year lease at the low annual rental of 5 per cent on the initial unimproved value of the land, but with the important proviso that holdings should be limited to 640 acres of first-class land and 2,000 acres of second class. This proved a popular form of tenure, for it practically amounted to a gift of the land for a nominal quitrent.

A third bill passed in 1892, was more important than either of the two. This was called the "Land-for-settlement act," and provided that at the discretion of the Government large estates could be taken

[8] Scholefield, Guy H.: New Zealand in Evolution, p. 189.

over, and after compensation had been rendered the owner, the lands could be opened up for settlement in 320-acre tracts or less.[9]

The political theory back of this act perhaps has been more potent in restraining large landowners than the actual acreage appropriated. Down to March 31, 1919, 1,839,602 acres had been acquired under this law and over 1,600,000 acres had been distributed to 5,741 settlers. Recently all of the acquisitions have been for discharged soldiers, but the appraised price has been too high for most applicants—37,263 acres valued at £556,810, or over $72 per acre, were acquired under this law for the year 1918–19.[10]

From 1892 until the present time the land laws have been gradually amended and consolidated until the whole structure is coherent, however complicated the details may be. The present situation, so far as the legal aspects are concerned, may be summarized as follows:

1. The limits of Crown acquisitions are 66⅔ acres for first-class land, 2,000 acres for second class, and 5,000 acres for third class.

2. These lands may be acquired (*a*) by cash purchase; (*b*) by lease for 25 years at 5 per cent of the original value with right of purchase; (*c*) by renewable lease at 4½ per cent for 25 years without right of purchase and with revaluation at the end of each period.

3. The old 99-year lease system is abolished, but the present holders under such tenure are undisturbed. They may, however, now purchase the land in cash or by installments.

4. Large estates may be appropriated by the Government and thrown open to settlement, but at present the appraisal values are too high to encourage applicants.

5. Land taxes have been materially increased during the war and now range (including 50 per cent supertax) from 62½ cents per $100 valuation for small holdings up to $4.36 per $100 for large estates of about $1,000,000 unimproved value. (The odd figures in the rates are caused by conversion of English to American monetary units.)

6. More important for pastoral purposes than any of these tenures are the provisions for grazing leases in the rough back lands. These leases are of two kinds (*a*) the small grazing runs not to exceed 20,000 acres with a minimum rent of 2½ per cent of the value, renewable and revalued at the end of 21 years; and (*b*) the pastoral runs, limited to a carrying capacity of 20,000 sheep or 4,000 cattle. Considerable cultivation of these runs is permitted but only for the purpose of raising winter feed and putting down grass. In this respect the methods of management on these runs is much like that of ranches in the Rocky Mountain States, where feed is raised in the valleys and pasturage is available on the hills.

The areas under various forms of tenure are given in detail in the New Zealand yearbooks, from which may be made a brief summary

[9] The effect of this revolutionary law was doubtful until accident made it popular. The owners of the Cheviot estate in Canterbury (84,000 acres), disputed the Government's valuation for taxes and they offered to surrender the estate at their own valuation. Perhaps somewhat to their surprise the Government accepted the offer, and in the course of time numerous small farms were created, with the result that nearly a thousand people occupied the area formerly occupied by about 40. (Cf. Scholefield, Guy H.: Op. cit., p. 187.)

[10] New Zealand Official Yearbook, 1919, p. 482.

in round numbers. Out of about 66,000,000 acres in the islands, approximately 43,000,000 acres are used for agricultural purposes. Of this amount about 19,000,000 acres are occupied by freeholders and about 24,000,000 acres are held under various forms of lease. Of these leases about 10,000,000 acres are "pastoral runs" (carrying not over 20,000 sheep or 4,000 cattle) and about 2,600,000 acres are in "small grazing runs" not exceeding 20,000 acres each. Only about 3,750,000 acres of Crown land are yet unclaimed, but practically all of this is rugged mountains, barren for agricultural projects.

All of this 43,000,000 acres of occupied land is, however, not under cultivation or even under grass. As a matter of fact nearly 26,000,000 acres are in a virgin state, of which about 15,500,000 acres are in tussock grass and 5,500,000 in timber. From this it will be seen that although Crown lands are no longer available there are great areas of unoccupied land yet awaiting bona fide settlers.[11]

Size of the Holdings.

The size of the large holdings in the Dominion has slightly decreased under pressure of the various land and tax laws until the problem of unproductive estates seems on the way to solution. In 1889 the average rural holding in excess of 10,000 acres was upward of 30,000 acres, whereas in 1910 it was about 20,000 acres. In 1889 there were seven landlords with estates aggregating almost 1,400,000 acres, or an average of about 300 square miles of territory for each man. By 1906 only one of these estates remained, and by 1910 no estate over 100,000 acres was listed. There were, however, in 1910 a number of holdings in excess of 50,000 acres. In fact, slightly over 20 per cent of the occupied area was in such blocks. By 1919 this percentage had decreased to about 12½. On the other hand, the middle-sized holdings have increased in the last 10 years. In 1911 holdings of 1,000 to 5,000 acres aggregated about 9⅓ million acres, or 23⅓ per cent of the occupied area, whereas in 1919 about 11¼ million acres, or 26 per cent, were in these blocks. Small holdings, ranging around 320 to 640 acres, have remained practically constant, and constitute about 4½ million acres, or roughly 10 per cent of the occupied area.

Rentals and Prices of Land.

The annual charges for land in New Zealand involve some peculiarities of primary importance in any comparison of the sheep industry in that country with the industry in other countries. In the Dominion a large part of the grazing area is held on long-term leases, and the charges are low for long periods of time. To so great

[11] New Zealand Official Yearbook, 1919, pp. 482–513.

an extent is this true that the war has scarcely affected the cost of grazing sheep. Table LXX brings out this point in a striking manner.

TABLE LXX.—*Rentals of Crown land.*[a]

Tenure.	Year ending Mar. 31, 1913.		Year ending Mar. 31, 1919.	
	Acres.	Rent per acre.	Acres.	Rent per acre.
Lease in perpetuity	2,291,237	$0.5494	1,802,172	$0.5576
Renewable lease	964,746	.6593	1,549,901	.7903
Small grazing runs	2,425,227	.1732	2,642,605	.1717
Pastoral runs	10,808,013	.0345	10,232,291	.0889

[a] Calculated from New Zealand Official Yearbooks, 1913 and 1919.

From these figures it is seen that there is practically no change in the rentals for any Crown leases except renewable leases. Moreover, the rates are quite low for pastoral purposes—17 cents per acre for "small grazing runs" and about 3½ cents for "pastoral runs" in both 1913 and 1919. These figures are important because they represent a large portion of the grazing area, although exact figures are not available for a statement of the number of sheep run on leased land as compared with freehold.

Another significant point in connection with the low rentals is the fact that practically no winter feeding is necessary for the range stock; rentals therefore represent almost the only cost of feed for the entire year.

One should be cautious, however, in drawing conclusions as to the effects of these low rentals upon the competitive position of the sheep industry in the islands as compared with other countries. In the first place, it is probable that within a few years the rents, especially upon renewable leases, will be increased by the process of revaluation. Moreover, no matter how low the grazing cost for sheep may be, the industry must still meet the competition of alternative pursuits, especially dairying. If the range will carry sheep only, the low rentals are a permanent advantage, but for its other uses the tendency toward a decrease in the flocks is just as potent as though the lands were bought and sold at a high figure.

Land Values.

The value of the land in New Zealand, like that of other countries, shows a great variation on account of the differences in fertility, proximity to markets, and other factors. Therefore, only average figures by districts are significant.

TABLE LXXI.—*Area and unit value of country land transferred, by districts, 1918–1919.*[a]

District.	Area, in acres.	Value per acre.
Auckland	668,123	$37.54
Taranaki	143,846	54.30
Wellington	270,124	80.82
Hawke's Bay	134,302	53.56
Poverty Bay	145,373	35.08
Nelson	65,493	17.38
Marlborough	39,350	30.00
Canterbury	190,705	51.88
Otago	158,820	23.37
Southland	137,577	28.64
Westland	18,599	18.10
Average	181,119	44.15

[a] Calculation made from New Zealand Official Yearbook, 1919.

This table gives the average purchase price for country land according to all deeds registered in the various land districts in the islands. Wellington has the highest average—$80 per acre. Hawkes Bay is next with an average value of $53.50 per acre, but is followed closely by Canterbury at nearly $52. The lowest valuations are in the Nelson and Westland districts—about $17 and $18 per acre, respectively. The average for all purchases during the year ending March 31, 1919, was $44.15.

These figures represent somewhat normal values before the recent speculative inflation swept the islands. Prices have risen greatly along all lines during the year 1919–20, and land values are now in many localities probably too high for profitable utilization for pastoral purposes. This may be a temporary matter, but it is none the less serious for the sheep and cattle raisers. Upon this point Consul General Winslow writes from Auckland as follows:

> There is bound to be a slowing down along speculative lines, with the possible exception of speculation in farm and dairy lands, which has run riot for the last two or three years. It is not uncommon now to hear of the sales of land at $800 and $1,000 an acre, and from $300 up is the prevailing price for land that is considered above an average. (Commerce Reports, Sept. 28, 1920, p. 1466.)

Comparable figures for the value of the country lands only are not available for previous years, but the value of all lands, both country and urban, may be determined from the yearbooks and are given as follows:

TABLE LXXII.—*Area and unit value of country and urban land transferred, 1910–1919.*[a]

Year ended Mar. 31.	Area in acres.	Unit value.	Year ended Mar. 31.	Area in acres.	Unit value.
1910	1,463,018	$32.66	1915	2,136,179	$39.19
1911	1,966,103	35.35	1916	2,421,080	44.75
1912	2,398,302	35.31	1917	2,756,007	60.54
1913	2,524,292	33.40	1918	2,014,526	43.68
1914	2,213,601	35.85	1919	2,013,468	60.90

[a] Calculation made from New Zealand Official Yearbook, 1919, p. 501.

From this table it will be seen that the unit value has practically doubled since 1910.

These average values do not, however, indicate the price of lowlands in certain favored regions. In some localities the price is from $100 to $200 per acre, and even the estates which have been subdivided for the benefit of soldiers had an average value for the year ending March 31, 1919, of about $72 per acre.

It should be borne in mind also that these figures include the value of urban land as well as rural territory. The significance of the urban element involved is shown by the fact that in Table LXXI the average value of the transfers of country farms was about $44 in 1919, as compared with about $61 for both country and urban transfers.

Taking all things into consideration, it seems that the land values, and land rentals especially are still favorable to the flockmasters. For the most part owners are selling the products of the herds at present prices and grazing the flocks on lands whose rentals are based upon values of several years ago. In a sense the same may be said of any pastoral country where the majority of owners have not recently purchased their holdings, but under such circumstances there is the complication of interest charges on present values regardless of when the purchase was made. In New Zealand, however, no such hypothetical expense can be claimed, where long leases are held at a low rental.

Carrying Capacity of the Land.

Some indication of the carrying capacity of the land in New Zealand is shown by the fact that although the area is almost exactly the same as that of the State of Colorado, it has, roughly, ten times the number of sheep as that State and almost twice the number of cattle. Millions of acres carry a sheep to every 2 acres, and many other large tracts carry two sheep to the acre. No tussock or virgin land will carry more than one sheep to 1½ acres. The average probably is about one sheep to 3 acres. One of the Government appraisers of wool, a large sheep owner, compiled the following estimates of the number of sheep that can be raised on land of various values.

Number of sheep to the acre.	Value per acre.
1	$16
2	27
3	48-300
4	60- 75
5-7	75- 85

Above $75 to $85 per acre it is estimated that the land is too valuable for sheep grazing under present conditions. If this is a true estimate it follows that the district of Wellington (where the land is valued on the average at about $80 per acre) has about reached its maximum as a sheep-raising area. Many portions of Hawke's Bay, and also of Canterbury, are probably running close to the margin, although the average land values are well under the calculated figure.

The land situation in New Zealand has been discussed at considerable length because not only in New Zealand but elsewhere it has been almost decisive in the development of the pastoral industry. The pioneer methods of flock management have necessitated in all countries wide ranges, unobstructed by settlement, or at least by agricultural crops, where the flocks are free to seek any pasture or any water available. As population increases the breaking up of the sheep runs is attended with periods of economic and even social stress which often threaten the whole industry. A second stage usually follows the pioneer condition in which the ranges are more or less preempted by great flockmasters, and considerable discretion is exercised over both the breeding and manipulation of the flocks and over the various kinds of pasture with respect to seasonal grazing and other considerations. In this stage the maximum output of wool and mutton at a minimum unit cost for a given area is often reached.

A third and final stage usually develops in populous countries where great estates are broken up, and sheep raising takes on the characteristics of intensive agriculture. Small flocks are usually run with mixed farming operations carried on simultaneously. As a rule the purity of types suffers under these conditions and the industry is on the decline relatively, if not absolutely.

It is clear from the summary of the New Zealand land situation that the pioneer stages of flock management have long passed, and that the last 25 years have been the era of great flocks scientifically bred. The disintegration of the large estates is now under way, both by legal and economic pressure, but whether the fragments will be too small for economical management of the flocks is a fundamental question. The increase of population and the development of world markets for New Zealand products are increasing the price of land to a point where sheep ranging is losing some of its differential advantage. This tendency is offset to some extent by the long leases at low rentals, but in the course of a generation the advantage will be lessened by revaluations based upon current conditions. More important still for the immediate future is the fact that the low rentals do not protect the flocks from the competition of other industries, especially dairying.

FLOCK MANAGEMENT.

History.

In New Zealand the first sheep run of any importance was established in 1844 from fairly pure Merino stock imported from Sydney, Australia. The type was the small hardy Spanish Merino, modified by 40 years of breeding in Australia, some of which was haphazard and resulted in deteriorated sheep. The industry developed rapidly and within six years the original run (Flexbourne, owned by Sir Charles Clifford) carried 70,000 sheep.

After the initial success of the Merino, flockmasters began importing almost every breed of sheep obtainable, and for a time confusion reigned and all sorts of mongrel breeds developed. In the course of time it was found that the heavy Lincoln and the Romney Marsh were best suited for the marshy flats of North Island and that a strong Merino strain, whatever the cross, was best adapted to the lighter and drier uplands and hill country.

In all these breeds, however, wool was the final desideratum. No matter how heavy or fine the sheep might be, its mutton value was practically nothing. By 1870 millions of sheep were melted down annually for tallow and fertilizer. Old stock were necessarily kept year after year until they could scarcely feed for lack of teeth or migrate with the younger stock. Such animals were worth but 12 to 15 cents per head for their tallow and the best of young mutton stock was worth but $1.50 and $2 each.[12] By 1880 the glut from overproduction brought ruin to many flockmasters and the whole future of the industry was uncertain.

Suddenly, almost overnight as it were, assistance came from an unexpected quarter in the form of a refrigeration process by which the fresh New Zealand mutton could be landed in London in as good condition as when it left the islands. Rarely is one able to set a specific date for an industrial revolution, but in this case February 15, 1882, probably deserves such a characterization because on that day the steamship *Dunedian* left Port Chalmers for England with almost 370,000 pounds of frozen mutton and lamb on board, which later sold in London for 13 cents a pound or $10.40 per 80-pound carcass. The whole problem of the mutton trade was by no means solved by the first successful shipment, but the effect upon sheep husbandry was sudden and profound. At first heavy, fat mutton was sent to the London market, but in the course of time a small fine-boned carcass, short and plump, was found to be most popular, and to meet this demand the whole course of breeding was changed. After many experiments the Leicester, both Border and English, became the favorite type for crossing with the Merino, and for many

[12] Cf. Scholefield, Guy H.: Op. cit., p. 126.

years it was the standard cross, especially in the fine-mutton district of Canterbury.

Size of the Flocks.

The chief impression obtained in looking over "The Annual Sheep Returns" for New Zealand is that the country is essentially a land of medium to small sized flocks. Most of them run around 500 to 700 head; there are very few flocks in five figures. Two or three large ones contain over 60,000 head, but they, in common with others exceeding 20,000, are disappearing before the tide of small farmers.

More exact information as to the size of the flocks than one gets from turning through the report of the sheep census is obtained in the following digest of figures:

TABLE LXXIII.—*Size of flocks and percentages of total flocks in each class.*

Size of flocks.	Numbers of flocks.[a]					Percentages of flocks in each class to total flocks.[b]				
	1886	1896	1906	1911	1919	1886	1896	1906	1911	1919
Under 500	1,659	12,028	11,793	11,463	11,719	65.80	67.94	61.23	53.34	48.69
500–1,000	1,189	2,605	3,431	4,366	5,466	13.00	14.70	17.81	20.31	22.72
1,000–2,500	1,279	2,352	2,558	3,703	4,637	13.97	13.54	13.29	17.23	19.27
2,500–5,000			782	1,130	1,440			4.05	5.25	5.98
5,000–10,000	263	340	394	540	611	2.87	1.92	2.04	2.51	2.53
10,000–20,000	228	231	213	216	162	2.49	1.30	1.10	1.00	.67
20,000 and upward	166	147	94	75	30	1.81	.83	.48	.34	.12
Total	9,149	17,703	19,265	21,493	24,065	100.00	100.00	100.00	100.00	100.00
Average size	1,659	1,081	1,041	1,116	1,073	.....	.....	.....	.....	.....

[a] New Zealand Official Yearbook, 1907, p. 592; 1919, p. 544.
[b] It should be observed that these percentages do not apply to the number of sheep in each size classification but only to the number of flocks.

The number of flocks under 500 has been fairly constant for the past 25 years—around 12,000—although the actual number of all flocks has increased from over 17,000 to about 24,000. This to say, the very small flock is decreasing in importance in the islands. Likewise the large flocks—over 20,000—have decreased from 166 in number in 1886 to 30 in 1919. The middle-sized—around 5,000—have increased constantly both in number and relative importance.

Perhaps the percentage of total flocks in each class is more significant than the actual number. In 1886 flocks under 500 were over 65 per cent of the total number, but in 1919 they were only about 49 per cent of the total. Flocks over 20,000 constituted nearly 2 per cent of the number in 1886 and only 0.12 per cent in 1919. The middle size—1,000 to 5,000—have increased from about 14 per cent in 1886 to 25 per cent in 1919. These percentages in all cases refer to the number of flocks and not to the number of sheep in each class.

Although the changes indicated in this table are considerable, yet taken as a whole no great developments in flock management have

taken place in New Zealand in the past quarter of a century so far as size of the flocks is concerned. The indications are that the industry has reached a considerable degree of stability and that no great changes may be expected in the immediate future.

Typical Stations.

On the average sheep station the buildings consist of the homestead, usually a substantial house of 8 or 10 rooms; stables, implement shed, woolshed, and men's quarters. If a manager is employed he probably has a cottage and there is often one for a married shepherd or plowman. The woolshed is usually at some distance from the house and consists of a large wooden building containing all the equipment for carrying on the shearing operations.

At the main entrance to the shed are the yards. These consist of large holding yards with a drafting race leading into smaller yards. Attached to the yards is the dip, with its own dripping yards and exit to a paddock.

Beyond the yards are the paddocks or fenced pastures, usually 200 or 300 acres in size, four or five in number, and composed of fairly fertile land covered with sown grass. The sheep run in these paddocks at lambing time, during and immediately after shearing, and in severe winter weather. Beyond the paddocks lies the summer range in the rough foothills, where the grass is good, but where the whole landscape is cut up by gulches, hills, and marshes.

Another important adjunct to a successful station, especially in the South Island, is 200 or 300 acres of fertile land for raising turnips, oats, rape, and other feed. In North Island large numbers of sheep are sent to the freezing works directly from the range, but in South Island some supplementary feeding is necessary. The plains of Canterbury are the center of the feeding industry, and considerable numbers of sheep from other Provinces are sent there to be prepared for market.

Shearing.

The shearing season is perhaps the busiest time of the whole year at a sheep station. During that time the woolshed becomes something like a factory, with humming machinery and a regular eight-hour schedule of labor under trade-union regulations covering every phase of the work.

The shed itself contains several large pens, called sweating pens, into which the sheep are crowded for two or three hours and sweated for the purpose of bringing out the oil, thereby facilitating the shearing operation. Adjoining the sweating pens are the catching pens, and next to the latter is a long platform, called the shearing board, where the actual clipping is done. Above the board, running the

full length of the shed, is a power shaft connected usually with a gas engine, though sometimes with steam and electric power. To this shaft, at intervals of a few feet, are geared the individual shearing machines or clippers. These work on the principle of a barber's clippers and are connected to the power shaft by jointed rods.

During the shearing season the gong sounds promptly at 6 o'clock in the morning and the shearers begin work as one man and continue for two hours. Breakfast is served from 8 to 9. After that hour the work goes on for periods of about one and one and a half hours each with 20-minute intervals for resting. These intervals are called "smoke ho," which indicates the chief occupation during the recess.

As each sheep is shorn it is pushed into a counting pen and the fleece is taken to the rolling or skirting tables, on which it is skillfully spread by the "picker-up." These tables are at the end of the shearing board and at them work two or three skirters to each dozen shearers. On one side are one or two piece pickers (per dozen shearers), who take care of the skirtings from the rolling tables. Over all these skirters and pickers is a wool classer, an expert in the quality and grades of wool and in the methods of skirting the particular fleeces.

The process of skirting consists of removing from the margins of the fleece inferior parts and the neck, the legs, and crotch in order to eliminate not only the inferior wool, but also as much dirt, burrs, and stained wool as possible. After the fleece is skirted it is rolled in such a manner as to require no strings and is passed on to the classer. In some respects this man is the center of the whole shearing operation because his recommendations (although not necessarily his authority) begin in the sorting pens where before the sheep are sheared they are segregated according to sex, age, and grade and his responsibility does not end until the brand and grade of wool is stenciled on the bale.

In classing wool, consideration is given first to its condition, whether heavy or light with grease and earth matter; second, its quality, that is, the diameter of the fiber; third, its strength and length of staple; and fourth, its color, and if stained, whether it will scour white.

An ordinary Merino flock will be classified usually into four or five grades, such as fine Merino combing wool in good and in medium grades of pieces from the picking table. Lamb's wool is always kept separate from the main clip and sometimes hoggets are also segregated. In classing crossbred flocks there is often a separation into grades—cross, fine, and medium—before shearing, and even then several different classes are necessary for each grade.

As the fleeces are classified they are thrown into bins to await the baling process. In baling, about 40 fleeces are trampled (in layers)

into burlap bags holding from 300 to 320 pounds, after which they are compressed in power presses and the burlap bag is securely sewed. After the bales are pressed, each one is branded usually with the owner's initials, the name of the station, the kind, the sex, the age of the sheep, and the station number. In this manner the wool can be traced from the remote New Zealand farm to the mills in England or the United States.[18]

This process of handling the clip applies more particularly to the large stations where thousands of sheep are sheared. A small holder can not carry out the theory of skirting or classing to the extent outlined here because his small clip would not justify the equipment or the expert labor necessary to do it. The tendency, on the contrary, is for the small producers actually to do less than sound business would dictate, and the wool dealers are continually urging them to keep up the standard of their clips.

Breeds of Sheep.

The numbers and relative importance of the various breeds of sheep in the islands may be seen from the following table:

TABLE LXXIV.—*Number of sheep in New Zealand, by breeds, April, 1919.*[a]

Breed.	North Island.	South Island.	Total in Dominion.
Distinctive breeds (registered and unregistered):			
Merino	56,861	851,721	908,082
Lincoln	340,131	32,694	372,825
Romney	2,261,249	614,302	2,875,551
Border Leicester	12,605	187,127	199,732
England Leicester	7,408	128,041	135,449
Shropshire	7,160	7,074	14,234
Southdown	35,331	14,145	49,476
Corriedale	34,845	397,465	432,310
Total	2,755,090	2,232,569	4,987,659
Flock sheep (including half-breeds)	11,456,854	9,384,041	20,840,895
Grand total	14,211,944	11,616,610	25,828,554

[a] New Zealand Official Yearbook, 1919, p. 545.

From this table it will be seen that there are great differences in the breeds in the two islands. In North Island the Merinos are almost negligible, whereas they are the most important breed in South Island, much more important, in fact, than the figures for distinctive breeds indicate. It is true that less than 10 per cent of the wool is classed as Merino, but there is a strain of Merino blood in practically all of the 8,250,000 head of stock sheep in South Island. In the dry hill country many flocks are almost pure Merino, though of an inferior type as compared with stud stock. The other extreme

[18] For a more detailed statement of wool shearing and classing, see Hawkesworth, Alfred: Australian Sheep and Wool, pp. 350–380; Smith, H. B.: The Sheep and Wool Industry of New Zealand, Ch. 12; and Hart, Stanley H.: Wool, p. 105.

is reached in the lowlands where in some flocks only a trace of Merino blood is introduced to give the mutton flocks a passable fleece.

The Romney Marsh is the predominant breed of North Island—about 2,500,000 out of 2,600,000 blooded stock. This sheep is better fitted than any other for the damp, wind-swept marshes of the island and is more nearly immune than any other to foot rot, a disease which occurs in wet areas. Furthermore, most of the stock sheep of the north are based on Romneys (crossed with the Lincoln). The breed is gaining favor also in South Island, where it is crossed with the Merino. Few crosses give good results and none better than this, both as a mutton and wool-bearing sheep. The wool is long stapled, bright, and fine, and the carcass is perfectly suited to freezing—smooth and plump, without excess fat, and running about 60 pounds dressed weight at 1 year old.[14]

As shown in the table the Corriedale is limited chiefly to South Island, where there are nearly 400,000 as compared with less than 35,000 in North Island. The two Leicesters, England and Border, are also limited to the South. These related types are of considerable importance in the New Zealand scheme of flock management, but their number is on the decline. The Lincoln is found chiefly in the North, where it is used to cross with Romney. Historically this type is more important than its numbers indicate because it was the basis of the cross with the Merino which evolved the Corriedale.

A curious fact in regard to practically all these breeds of sheep is that after a few generations in New England they develop differences from the types of the same names elsewhere. Whether from climate or selective breeding, or both, the extreme characteristics of particular breeds are lost, and they tend more toward a well-balanced, all-purpose sheep. Romneys and Lincolns become smoother and finer grained, and their wool thickens into much better fleeces than are grown on these types in other countries. Even Merinos produce good mutton lambs on the Canterbury plains.

The variety of New Zealand breeds evinces the remarkable fitness of the Dominion for all sorts of sheep, and it shows also that almost equal emphasis is placed upon wool and mutton. It is often assumed that because a country is an important factor in the mutton trade it necessarily neglects wool production. As a matter of fact the production of large amounts of young mutton, especially lambs, is entirely consistent with a large wool output, because the range flocks may approximate the half-blooded Merinos and at the same time the lambs may be three-quarter-blooded mutton type.

The mutton and lamb traffic may be said to begin with the large wool-bearing flocks in the remote pastoral country. There, as a

[14] See Hawkesworth, Alfred: Op. cit., p. 110; also Smith, H. B.: Op. cit., p. 20.

general practice, the wether lambs are sold to farmers or graziers to be fattened, while the ewe lambs are kept until the autumn of the following season, when the surplus is sold for breeding purposes, chiefly to holders of the better class of pastoral land. These holders in turn pass on the ewes, as they become aged, to the smaller farmers, who provide them with fodder and obtain from them one or two crops of lambs, before they fatten them for the market.[16]

DISEASES AND PESTS.

New Zealand is free from diseases affecting sheep. Scab has been totally eradicated, and probably the only disease that the farmer ever comes in contact with among his sheep is a mild form of foot rot. This he guards against either at shearing time or when he brings his sheep in for dipping.

In North Island the sheep grower is absolutely immune from pests, but in the South the spread of rabbits is a serious and constant nuisance. This animal was introduced into the southern part of New Zealand many years ago for sporting purposes, but it increased so rapidly that stringent laws had to be made for its extermination. Notwithstanding all the efforts of the farmers to trap or poison them and to block off whole counties with rabbit-proof fences, there are still large areas in which the rabbit has almost ousted the sheep. Every farmer is bound by law to keep down the rabbits on his property and is liable to a heavy penalty if an inspector thinks he is not doing enough. One clause in the rabbit act provides that anyone found with a live rabbit in his possession or anyone turning rabbits loose is liable on summary conviction to a penalty of £50 ($243.33) or to 12 months' imprisonment.

Some indication of the number of rabbits in South Island may be obtained from the following comparison of the number of rabbit skins and sheepskins exported in the last five years.

	1914	1915	1916	1917	1918
Rabbit skins [a]	4,312,171	6,090,872	5,896,410	4,944,607	7,854,151
Sheepskins	8,525,611	9,093,850	8,335,570	6,528,053	8,741,538

[a] New Zealand Official Yearbook, 1919.

In view of the fact that 8,000,000 or 9,000,000 sheepskins are obtained annually from about 25,000,000 sheep in the regular course of slaughtering operations, it is probable that the 6,000,000 or 7,000,000 rabbit skins obtained in a somewhat haphazard manner represent a rabbit population running into scores if not hundreds of millions.

[16] See Agriculture in New Zealand, New Zealand Department of Agriculture, Industry and Commerce, p. 15.

One slight offset to the ravages of the animals is the value of their meat and skins. For the year ending March 31, 1919, the value of skins exported was roughly $1,450,000 and that of rabbit meat, both frozen and tinned, was something over $740,000, or a total of nearly $2,300,000. This amount is a small recompense, however, for the ravages of great areas of pasture land.

LABOR.

On stations carrying 5,000 sheep probably two shepherds are required all the year round. Much, however, depends on the character of the country. A shepherd in New Zealand is very different from a sheep herder in America. In the former country sheep are turned out in pastures covering a very large area and may not be "mustered" for weeks, and the sole duty of the shepherd is to ride around the fences and paddocks. As there are no predatory animals in the Dominion there is no necessity for herding the sheep at night. During the lambing season he has more work to do, although the sheep are not brought in as they are in Great Britain.

On small runs and on most farms no shepherds as such are employed. Any shepherding work required is done either by members of the family or by ordinary farm hands. During the shearing season, especially in the high country, men are employed for mustering purposes. This is labor that requires a certain amount of skill and an ability to "rough it," and the men who follow this business have necessarily had several years' training.

Shearers and shed hands are in a class by themselves and are entirely distinct from the other station labor. They are closely organized in a trade-union and have minute regulations covering all their relations with the flockmasters. The New Zealand Court of Arbitration takes cognizance of the smallest points of difference between employer and employee and sets the rates of pay, hours of labor, and other terms, for several years in advance.[16]

INVESTMENTS, EXPENSES, AND RECEIPTS.[17]

Detailed cost data for calculating the unit cost of running sheep in the islands are not available, but important items of investment and expenses have been obtained for the year 1919.

[16] A typical labor award is that issued by Judge Stringer, of the Canterbury industrial district, under date of Oct. 24, 1919, and covering the period from Sept. 1, 1919, to Feb. 28, 1921. In this award the following subjects are considered: Duties of shearers, hours of work, rates of pay, payment of shearers, settlement of disputes, general provisions, grindstone, combs and cutters, engagement of shed hands, duties of shed hands, rates of pay—shed hands, payment of workers, limitation of award, matters not provided for, employers to have control, absent without leave, free grasing for one horse, rations, dining room to be lighted, contract work, no discrimination, employment of members and nonmembers, medical chest, timepiece, scope of award, and term of award.

[17] Assembled from data in special report by Consul General Winslow, Auckland, New Zealand, Dec. 23, 1919.

INVESTMENT ITEMS.

1. Land:
   - (a) Farming land, $50 to $75 per acre.
   - (b) Grazing land, $25 to $50 per acre, carrying 2 to 4 sheep.
   - (c) Range land, $5 to $10, or an anual rental of 5 cents to 20 cents per acre, carrying less than 1 sheep.
2. Tenant houses, about $1,200 each.
3. Fences:
   - (a) Rabbit fences, $730 to $870 per mile.
   - (b) Other fences, $340 to $400 per mile.
4. Dipping plants, $350 to $1,000 each.
5. Wool presses, $100 to $300 each.
6. Shearing plant, $1,500.
7. Sheep:
   - (a) Inferior stock in large flocks, $3 to $4 per head.
   - (b) Average stock on the plains, $6 to $7 per head.
   - (c) Romney and Lincoln ewes, $7 to $10 per head.
   - (d) Stud ewes, $15 to $25 per head.
   - (e) Flock rams, $20 to $60 per head.
   - (f) Best stud rams, $500 to $1,000.

From these figures it will be seen that a medium grade 5,000-acre ranch with its mixture of good and bad land and carrying 6,000 to 8,000 sheep will cost, including improvements and sheep, from $175,000 to $200,000.[18]

EXPENSES.

1. Labor:
   - (a) Shepherds, $50 to $75 per month and board.
   - (b) Musterers (part time), about $75 per month and board.
   - (c) Shearers, $7.30 per hundred sheep and board; $8.30 without board.
   - (d) Shed hands and pressers, $17 per week and board; $21.85 per week without board.
   - (e) Cooks, about $20 per week and board.

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[18] A purely hypothetical ranch of Canterbury would cost something as follows:

Land:		
1,200 acres pasture land, at $35	$42,000	
800 acres arable land, at $60	18,000	
3,500 acres rough land, at $10	35,000	
		$95,000
Stock:		
6,000 to 8,000 sheep, worth about $7 per head		50,000
Fencing:		
10 miles of rabbit fencing	$8,000	
12 miles of other fencing	4,500	
		12,500
Other improvements:		
Homestead	10,000	
2 tenant houses	2,400	
Dipping plant	500	
Wool press	200	
Shearing plant	1,400	
Other live stock and machinery	10,000	
Miscellaneous	3,000	
		27,500
		185,000

2. Maintenance:
   Pasturage and feed in agricultural districts (on land worth about $35 per acre), $0.75 to $1 per head; in the back country (on land at $5 to $10 per acre), 30 to 40 cents per head per annum.
3. Dipping, about 2 cents per head.
4. Use of rams, 15 to 20 cents per ewe.
5. Taxes:
   Land, income, and local, 3 to 4 cents per head for average holdings.
6. Losses, 3 to 5 per cent per annum.

This list of expenses covers only the more obvious items and is not exhaustive. Such expenses are significant only for comparison with similar items in the sheep industry of this country, but the unit cost for running sheep could not be calculated from them.

PRICES.

Recent prices of wool and mutton have been disturbed in New Zealand, not only because of industrial unrest, but also because the imperial control expired on June 30 of this year (1920) and the markets have not yet settled to a true competitive level. For these reasons the control prices are given as indicative of conditions for some years past, although they admittedly are not representative of present conditions.

The British Government purchased four wool clips—the seasons of 1916, 1917, 1919, 1920, inclusive—and all of the frozen meat in the islands from March 3, 1915, to June 30, 1920. The prices of wool were based on the quotations of the season 1913–14, to which was added 55 per cent in each case for the various grades. Upon this basis the prices figure out as follows:

TABLE LXXV.—*New Zealand wool, imperial purchase prices,*[a] *seasons 1916–17 to 1919–20, inclusive.*

Superior Merino combings	$0.3775–$0.4563
Medium to good Merino	.2942– .3618
Inferior Merino	.2673– .4143
Superior half-bred	.3775– .4405
Medium to good half-bred	.2492– .3775
Inferior half-bred	.2832– .3146
Superior crossbred	.3303– .3775
Medium to good crossbred	.2832– .3451
Inferior crossbred	.2438– 2832
Lincoln and Leicester	.2752– .3303
Lamb, good	.3451– .4090
Lamb, medium	.2832– .3382

Actual average value of purchase.[b]

1916–17	$0.2998
1917–18	.3012
1918–19	.3048

[a] New Zealand, Department of Imperial Government Supplies, 1919, p. 16.
[b] U. S. Commerce Reports, Jan. 19, 1920.

In addition to these prices, the New Zealand growers were to receive one-half of the net profits on all wool sold for nonmilitary purposes.

The prices of sheep and lambs as such were not fixed during the war, but practically the same result was accomplished by fixing the price of frozen meat. As the date of giving up control approached—July 1, 1920—prices for live stock rose in anticipation of higher meat prices. For this reason the prices for sheep quoted in the following table are taken as of June, 1918:

TABLE LXXVI.—*New Zealand prices of sheep and mutton, 1918.*

Kind.	Price per head.[a]	Fixed price frozen mutton, per pound.[b]
Fat sheep:		
Prime crossbred wethers	$9.73–$11.19	$0.0913
Medium crossbred wethers	7.90– 9.48	.0860
Prime crossbred ewes	9.00– 10.46	.0812
Medium crossbred ewes	7.30– 8.76	.0761
Prime lambs	6.81– 8.03	.1141
Medium lambs	6.06– 6.69	.1065
Feeders:		
4-tooth ewes	6.07– 7.90	.....
2-tooth wethers	6.08– 7.30	.....
4-tooth wethers	6.56– 7.90	.....
Ewe lambs	6.06– 6.69	.....

[a] Pastoral Review, Christchurch Market, June, 1918.
[b] Government price, Oct. 20, 1916, to June 30, 1920, inclusive.

Those familiar with the sheep industry in the United States will recognize that the quotations for both wool and mutton in New Zealand were lower than similar prices in this country during the war. Because of the fact that New Zealand prices are per head of sheep whereas they are quoted in the United States per pound, no exact tabular comparison is attempted. In general, it may be said, however, that fat sheep in the Dominion ranged from 7½ to 10 cents per pound as compared with 10 to 15 cents for similar stock in the Chicago market during 1918.[19] Perhaps it may be safely concluded that prices of sheep were about 50 per cent higher in the United States during the war than in New Zealand.

[19] Prices of sheep and mutton, United States, 1918.

Kind.	Per 100 pounds.[a]
Choice and prime lambs	$15.75–$16.25
Medium and good lambs	14.00– 15.75
Choice and prime yearling wethers	12.00– 12.50
Medium and good yearling wethers	11.00– 12.00
Choice and prime ewes	10.25– 10.50

[a] American Sheep Breeder and Wool Grower, Oct. 10, 1918, Chicago market.

The prices of wool in the United States were almost exactly double that fixed by the Government in New Zealand. Here again, because of the difficulty of matching grades, no attempt is made to show the comparison by price tables, but the range for ordinary territory wool may be given as between 50 and 60 cents per pound f. o. b. in the Rocky Mountain States as compared with 28 to 30 cents per pound for the average price for New Zealand wool.

MARKETING.

The British imperial purchase of wool ceased June 30, 1920, and the usual open market has been resumed. In normal times practically all the wool produced in the islands is sold at auction during a period of about five months. The first sale is generally held in November and the final one about the first of March. Sales are held at Auckland, Napier, Wellington, Christchurch, Timaru, Dunedin, and Invercargill. These are all seaports, and there are therefore facilities for getting the wood away immediately after a sale.

After the producer has finished shearing, he consigns his wool to his agent in one of the towns mentioned. This agent is generally a member of a firm of stock and station agents, who are also auctioneers. The wool is sent in packed in jute bales, legibly marked with the owner's brand, the number of the bale, and the grade of the contents. It goes straight to the wool store of the firm to which it is consigned. On arrival it is placed in position, and entered in the catalogue, with a description of its quality as given in the owner's specification. Each bale is then cut open at one end, so as to be ready for inspection by the buyers. Prior to this, however, a valuation is made by the wool expert of the auctioneering firm, and this valuation is sent to the vendor. He may want a higher price for some qualities, and he will so advise his agents. About a week before the date of the sales the catalogues are closed. The printed catalogue is then sent out to the buyers, who visit the stores to value the wool. Practically all the leading wool houses of the world are represented at the sales, and the wool is sold in open competition to the highest bidder.

Should a bid not reach the vendor's valuation, however, the lot is "passed" to the highest bidder, and next day the agents endeavor to get the vendor to come down or the buyer to increase his bid. There is generally such a small margin between the two that the lots go to the buyer to whom the wool was "passed."

Immediately after the sale the buyers give branding and shipping instructions to the various brokers. The bales are then sewed up and branded. Next they are "dumped;" i. e., two bales are pressed into the space usually occupied by one, and thereafter they are de-

livered to the ship. In a few days the buyers receive invoices and specifications from the brokers, and on the fourteenth day after the sale they pay for the wool which they have bought. Up to the time the brokers receive payment they still hold a lien on the wool. When paid they give a release to the buyer. He presents this to the shipping company and receives in return the bills of lading. These he attaches to his invoices and hands to his bank, together with the drafts to cover his disbursements.

There is a keen demand for wool at these sales and all the leading wool houses of the world are represented. During a normal wool season the facilities for shipment are good and steamers are always available at ports where the sales are held. There is a regular service to San Francisco and Vancouver in both cargo and passenger boats, and from these cities the wool is sent by rail across the continent. There are generally also two or three boats direct to Boston or New York during the season.

MARKETS FOR WOOL AND MUTTON.

A small amount of wool, about 5 per cent of the total, is taken each year by the New Zealand woolen mills, 11 in number. The products of these domestic mills are high in quality for the class of products and are made from a better grade of wool than the average grade produced in the islands. That is to say, the local mills secured about 20 per cent Merino, 30 per cent half-bred, and 50 per cent crossbred, whereas only about 5 to 7 per cent of the total clip is Merino wool.[20]

Roughly, 90 per cent of all wool exported from New Zealand goes to the United Kingdom in normal times. From 1912 to 1917, inclusive, the range was from 88 per cent to 84 per cent. In 1918, however, the percentage fell off to 74. The United States obtained normally about 2½ per cent of the exports, but during the war these increased about 7½ per cent. The remainder is distributed among other parts of the British Empire and Central Europe with some exports in recent years to Japan.

The American consul general at Auckland, New Zealand, reports under date of August 25, 1920, that the total accumulation of raw wool in that country is 70,000 bales, freezing works slipe; 68,000 bales of Government wool, scoured and slipe; and 274,000 bales of greasy wool. Under normal conditions there is usually no stock of wool on hand at this time in New Zealand. The above estimates consist of approximately 9 per cent high-grade, 61 per cent medium, and 30 per cent log-grade wool.

Under normal conditions practically all of New Zealand's mutton and lambs go to England. Only in rare cases are any sent to the

[20] New Zealand Official Yearbook, 1918, p. 532.

United States. According to the New Zealand export figures practically none was sent to this country during the war. Since the war, however, especially in the present year (1920), the situation has been changed, and large quantities of frozen lamb are going both to the eastern and western ports of the United States. The amount of this trade may be seen from the following tables:

TABLE LXXVII.—*Exports of mutton and lambs from New Zealand.*[a]

Year.	Mutton—Number of carcasses.	Lambs—Number of carcasses.
1915	2,522,448	3,692,008
1916	2,939,611	3,750,590
1917	2,409,899	2,797,290
1918	2,150,505	2,048,612
1919	1,300,047	916,912
Average, 10 years	3,192,506	3,030,572

[a] New Zealand Official Yearbook, 1919.

TABLE LXXVIII.—*Imports of lamb into the United States from New Zealand.*[a]

1920.	Carcasses.	Pounds.
April	528,800	17,047,500
June	222,568	7,344,744
August	206,453	6,916,175
September (up to 14th)	377,694	13,234,055
Sept. 27 (S. S. Hororata)	194,876	6,820,660
Total	1,530,391	51,362,484

[a] The Market Reporter, U. S. Department of Agriculture, Oct. 2, 1920.

From the first table it will be seen that the average exports of mutton and lamb for the past 10 years from the islands somewhat exceeds 3,000,000 carcasses each. In 1919, however, the exports of lamb dropped to less than a third of normal, about 916,000 carcasses.

Table LXXVIII, showing the imports of lambs into the United States from New Zealand, indicates that the accumulated stores of frozen meat are now being distributed. Five cargoes arrived in this country during the period April to September, inclusive, 1920, carrying a total of 1,530,391 carcasses, weighing 51,362,486 pounds. In other words, these cargoes carried over half the normal export of lamb for the islands and nearly twice as much as was sold to the world in 1919. Little or no mutton apparently has come to the United States because a better market for it has been found in England.

CHAPTER 16.

WOOL GROWING IN ARGENTINA.

SUMMARY.

The Republic of Argentina has a great diversity of geographical features which result in wide ranges of temperature, rainfall, and soil fertility. The regions of chief importance for the pastoral industry, however, are the central plains in the Province of Buenos Aires, the Patagonian plains occupying most of the southern portion of the country, and the limited pasture land in the foothills of the Andes near the Strait of Magellan.

Twenty-five years ago the Province of Buenos Aires was the center of the sheep and wool industry, but recently agriculture has been forcing the flockmasters farther south. Although there are still immense estates in this Province, they are decreasing before the advance of small farms. In 1902, for example, there were about 1,500 estates running over 12,500 acres, whereas in 1912 this number had decreased to less than 1,000. Later figures are not available, but it seems probable that the decrease is still going on.

Because of soil fertility, the carrying capacity of the central plains is quite high, usually more than one sheep to the acre. Near the Strait of Magellan there is a damp area which will also carry about one sheep to the acre. Farther north, along the foothills of the southern Andes, extends a narrow strip which will carry one sheep to 2 or 3 acres. Over much of the Patagonian country, however, it requires 8 or 10 acres per head.

Land values and rentals are roughly the converse of the carrying capacity. In Buenos Aires about 25 per cent of the farms rent for over $6 per acre, and nearly 85 per cent of them run over $2 per acre. Less than 1 per cent of the farms rent for around 10 cents an acre. In the Province of Chubut, on the other hand, about 33 per cent rent for less than 8 cents an acre, and only about 20 per cent run over $2.

No figures are available for Government land in the Provinces, but in the 10 Territories, roughly 210,000,000 acres out of 300,000,000 acres are yet unclaimed. Much of this area, however, is not in the pastoral district and is unimportant for such purposes. The two

southern Territories of Chubut and Santa Cruz have about 100,000,000 acres of public land out of a total area of 120,000,000. Most of this land is relatively useless. however, even for grazing purposes, and only by the spread of irrigation in the valleys will the desert uplands be worth claiming.

Taken altogether, it seems that the future of the sheep industry in Argentina, so far as the rearing of fine-wooled sheep under range conditions is concerned, lies in the semiarid Provinces of the south, whereas the mutton types will develop chiefly in the agricultural Province of Buenos Aires. Over the country as a whole, the sheep are decreasing. From the high peak of nearly 80,000,000 in 1890 the number has dropped to practically half that amount in 1920. Buenos Aires, which once had over 50,000,000 sheep, now has around 18,000,000. The breeds are shifting toward the mutton types under the pressure of competition from other industries, but the flocks probably never will get back to the high mark of 25 years ago.

On the other hand, cattle and agricultural crops are on the increase. From about 337,000,000 pounds of beef exported in 1905 there was a steady increase up to 1918, when the exports of beef alone were over 1,000,000,000 pounds. Mutton and lamb exports have remained fairly constant in the past 20 years. The exports of wheat and linseed also show little fluctuation, but maize increased to a considerable extent up to 1915, after which the exports fell off, perhaps, because of heavy feeding to live stock. Dairy products have increased enormously. The exports jumped from about 8,000,000 pounds in 1914 to nearly 70,000,000 pounds in 1919.

Seventy-five per cent of all Argentine wool is of the long-wool variety and comes from the crosses of Lincoln and Leicester on various kinds of flock sheep, though the number of purebred stock of these types is not large. The Romneys are coming in to some extent also. In the southern Territories the Merino, chiefly the Rambouillet, crossed on the native stock, is the leading type.

Detailed costs for running sheep in Argentina are not available, but some careful estimates have been given for various parts of the country. One estimate for the Province of Buenos Aires on a ranch carrying 25,000 head of sheep places the running expenses at about $3 per head, or about 23 cents per pound of wool produced, if the joint expenses for wool and mutton are allocated to each product in proportion to the receipts from each. In the Province of Chubut, on a ranch carrying 8,000 sheep, the cost is estimated at about $1.25 per head, or, roughly, 21 cents per pound for the wool. In the latter case, the estimated cost of wool is nearly as high as in the first instance, although the cost of running sheep per head is less than half of that on the Buenos Aires estate. This is due to the fact that re-

ceipts from mutton in the southern Territories are small as compared with the receipts from wool.

Wages are, roughly, one-half those for similar labor in the United States. According to estimates made in July, 1919, shepherds and flock keepers received about $42.50 per month, and native peons somewhat over $38 per month. In addition to this, the cost of the food for each person ranges from $10 to $15 per month.

Very little winter feeding is necessary anywhere in the country. When feeding is carried on, either during the winter or in preparation for the market, alfalfa is usually used, the prices varying from $10 to $15 per metric ton, and in some cases up to $20.

In normal times, most of the Argentine wool goes to northern Europe, but during the war this market was not available and the United States took a large portion of the clip. In 1914 less than 40,000,000 pounds came to this country; in 1915 the total jumped to over 113,000,000; and the high peak was reached in 1917, when nearly 200,000,000 pounds came. Recently the drift to northern Europe set in, and in 1920 over 130,000,000 pounds went to Germany and Belgium, chiefly the latter country, as compared with about 70,000,000 pounds to the United States.

The prices of Argentine wool follow those of the world market for similar grades and need not be repeated in this summary. The market in Buenos Aires has recently been demoralized and price quotations are largely nominal.

No accurate figures for the stocks on hand are available, but from estimates based upon the movement of Argentine wool in recent months the figure was probably something less than 200,000,000 pounds of old wool on December 1, 1920—about two-thirds of a normal clip. In addition to this amount, the new clip of 1920 is largely unsold.

This surplus with the resulting low prices in Buenos Aires is a temporary matter, however, and it seems certain that in the long run Argentina will never again be the great reservoir that it once was for cheap wool produced under pioneer range conditions.

CLIMATE AND PHYSICAL FEATURES.

Geographically there are four great divisions of Argentina—the mountainous regions of the west and northwest, the flat plains of the east-central portion, the tropical forests of the north, and the semiarid plains of Patagonia in the south.

The Andes Mountains, separating Argentina from Chile, are the most striking physical feature of the country. Rising in places more than 22,000 feet, they prove an effective barrier, not only to trade and commerce, but also to animal and vegetable life, and even to the winds from the Atlantic and Pacific Oceans.

In the northwest portion of the Republic the main range sends out high spurs several hundred miles long, with the result that great areas lie near the snow line with little or no vegetation. The plateaus here are strewn either with broken rock or rifts of sand that are constantly shifting before the cold, dry wind.

Farther south, in the Provinces of San Juan and Mendoza, the mountain slopes are gentler and merge gradually into the plains, but the same reaches of desert sand are found and similar gales of wind drift it about.

Still farther south, approaching the Strait of Magellan, the winds from the Atlantic drop their moisture as they approach the mountains. The slopes are covered with forests of birch and pine, and many grassy valleys are wedged in between the rugged foothills. This narrow strip of woodland and pasture reaches several hundred miles southward toward the cape, and is being used more and more for sheep range.

As the tip of the continent is approached the mountains become lower and less rugged until in the adjoining Island of Tierra del Fuego—the eastern part of which belongs to Argentina—most of the spurs become lumpy hills, snowcapped the greater part of the year because of the high altitude, yet covered with rich grasses over most of their area. This region is traditionally inhospitable to man because of the strong, cold winds and fog that sweep the island, but the surrounding ocean keeps the temperature above freezing most of the year, and the ground is covered with close-set forage plants, such as white clover, redtop, and other grasses similar to those found in the Kentucky and Ohio pastures of this country. The island and the adjoining portion of Patagonia on the mainland resemble northern Scotland, with its cold, wet climate and broken uplands on which sheep find good pasturage the year round.

East of the southern Andes, in the territories of Rio Negro, Chubut, and Santa Cruz, lie the great plains of Patagonia which are legendary in their immensity. Along the Atlantic seaboard these plains are flat and monotonous and covered with sand and shingle—once the wide beach of the sea. Farther inland the country is broken into barren hills with some valleys in between where alluvial soil is found. These valleys, usually 1 or 2 miles wide, raise good forage crops when water for irrigation is available, but the rainfall is deficient over the whole country, and so only the larger streams fed by the Andean snow ever reach the sea. Precise records of rainfall are not available for most of this area, but in the territory of Pampa Central it averages around 20 inches annually. Other regions farther south are much drier. Although the general appearance of the country is desolate, especially when the high wind drives the sand in clouds before it, some nutritious grasses grow on the plains, and a shrub

called "Alferillo" yields winter feed for thousands of sheep after the grass has withered. The number of sheep on these plains is constantly growing, and by irrigating the valleys for winter feed the carrying capacity of the land could be easily doubled.

North of Patagonia, and merging into it by slow degrees, are the great plains of Buenos Aires. This area, roughly 250 by 500 miles in extent, is flat, treeless, except for planted groves, and is practically without rivers, and even without the usual small streams found in such districts elsewhere. Only the plains of the Mississippi Valley can compare with this region in immensity and fertility. In the northern portion of the plains, bordering the Plate River system, the country is low and marshy and subject to floods. Farther south and west no such advantages exist, and the crops of wheat and corn, and the herds of cattle and sheep are well known among students of agriculture. As a matter of fact, the yield per acre is not remarkable as compared with that of the Middle West of the United States, but the extensive scale on which estates are conducted has made the country famous. These plains are so well adapted to live stock that a few cattle and horses wandering away from the early settlers soon bred wild stock that later became the pest of the country. At one time hundreds of thousands of these animals were hunted and killed annually for their skins, and for two centuries it seemed to be a question whether man or beast would dominate the country.

The rainfall is unevenly distributed in the Province of Buenos Aires, both with respect to season and topography. Nearly two-thirds of the precipitation occurs in the summer and fall (January to June), and the variation from north to south in the Province is [illegible] more marked. Along the northern border the annual average is about [illegible] inches, while in the south—at Bahia Blanca, for example—it is only about [illegible] inches. Over much of the central plain, [illegible] precipitation is at average, and droughts are often severe [illegible] years. In many cases these would be disastrous [illegible] were not that the whole area is flat and has a porous soil, with [illegible] that the small rainfall is absorbed rather than lost in [illegible]

[illegible] the mountains is a region almost [illegible] agricultural purposes. Alternate stretches of salt [illegible] most of the country, and little or no [illegible] rainfall.

[illegible] the northern portion of Santa Fe and the [illegible] the great forests of the tropics. The plains [illegible] in a remarkable

area of rolling hills on which forests and grassy pastures alternate, and the forests of the tropical north are as noted for their extent as are the treeless plains farther south.

Rainfall records for the forest region are not available, but in Entre Rios, the intermediate ground between the plains and forests, the precipitation is from 50 to 60 inches annually. Agriculture flourishes in this belt, but sheep raising is on the decline.

The whole north country is potentially rich, and great quantities of quebracho products—both logs and the tannin extracted from them—are marketed annually, but for years to come the chief products probably will be taken directly from the jungle.

For purposes of sheep raising, however, the areas of chief interest in Argentina are the great plains of the central region where sheep once almost overran the country, but where now the land is largely devoted to more intensive agriculture; and the southern semiarid region of Patagonia, whose development for pastoral purposes lies largely in the future. In addition to these areas, the low hills at the foot of the southern Andes, carry numerous bands of sheep and are to be included in any general view of the pastoral regions of the country.

THE LAND SITUATION.

The Argentine law provides for an equal division of property among heirs, but in actual practice this is rarely carried out. Traditionally, the Argentinos' point of view concerning landed property is more nearly that of Europeans than that of the average North American. That is to say, in many cases, great estates are considered almost inviolate, and social distinction goes with large holdings, whereas in the United States land is valuable only in terms of money. This view of land ownership, though not universally held in Argentina, is sufficiently general to exert a marked influence on the land system. There prevails a pronounced social distinction between large and small land owners. Indeed the line between large landowners and the tillers of the soil, whether they be small owners or tenants constitutes a social barrier not easily passed. The extent to which large holdings confer distinction upon the owner, almost regardless of the income derived is an obstacle to the economic tendency toward smaller holdings that comes with increasing population. As long as land is bought and sold freely by the acre for what it is worth in terms of capitalized income, there can scarcely be a land problem; but when vast estates are held together for many generations and are subdivided only under actual necessity, the normal development from large to small holdings is interrupted, and the shift from extensive to intensive methods, both by way of farm crops and animal husbandry, is postponed. Smaller holdings will come

inevitably in South America, but the present order will probably not break down into the numerous holdings of middle-class farmers but rather into estates of considerable size interspersed with small garden farms near the cities.

How vast some of these estates are can scarcely be realized by the ordinary American farmer. Farms as large as a congressional township (36 square miles) are not unusual even in the fertile valleys, and Government leases of range land of 50,000 acres (nearly 80 square miles) are often made. On some of these estates as many as 20,000 cattle and 4,000 sheep are carried, and, what is more important, all of this stock may be practically pure bred, or at least carefully bred for a particular purpose.

The homestead is usually a gentleman's country seat, often copied after European manor houses, and is surrounded by coaching stables, golf courses, and other appurtenances of such an establishment.

More concrete evidence of the size of the holdings may be obtained from the following table:

TABLE LXXIX.—*Size of holdings in certain parts of Argentina.*[a]

Size of farms.[b]	Number of holdings.			
	Province Buenos Aires.		Territory pampas.	
	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	—	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]

The actual area comprised in these various classes of holdings can not be calculated exactly from available figures, but if the size of the average farm is assumed to be one-third greater than the lower figure for each class (obviously there will be more small farms in each class than large ones) some approximation of the area held may be obtained. Thus, if the average farm in the 12,500 to 25,000 acre class is 17,000 acres, a total of over 16,000,000 acres was in such blocks in 1902 in the Province of Buenos Aires, and nearly 11,600,000 acres in 1912. These figures are to be compared with a total area of about 970,000 acres in the 125 to 250 acre range in 1902 and about 1,570,000 acres in 1912, assuming the average farm of this class to be 170 acres in both years.

In the Pampa territory the number of large estates, 12,500 to 25,000 acres, decreased from 1,114 in 1902 to 431 in 1912, and the ranches of 3,000 to 6,000 acres—1,412 in number—are the outstanding feature in the latter year.

TABLE LXXX.—*Size of holdings by percentages.*[a]

Area of farms.	Buenos Aires.	Santa Cruz.	Area of farms.	Buenos Aires.	Santa Cruz.
	Per cent.	*Per cent.*		*Per cent.*	*Per cent.*
Less than 1,500 acres	71	16	12,000 to 30,000 acres	2	21
1,500 to 3,000 acres	13	12	30,000 to 60,000 acres	1	12
3,000 to 6,000 acres	8	16	60,000 to 90,000 acres	1	3
6,000 to 12,000 acres	4	17	Over 90,000 acres	1	3

[a] Col. House inquiry, January, 1919.

Table LXXX brings out the difference in the size of the holdings in the thickly settled Province of Buenos Aires and the sparsely peopled Territory of Santa Cruz in southern Patagonia. In the former district only 5 per cent of the number (not area) of farms was over 12,000 acres, whereas in Santa Cruz about 40 per cent were over that area. The actual area represented by these percentages is more or less a guess, but it seems probable that 75 to 80 per cent of the pastoral area of Santa Cruz is in holdings of 12,000 acres and over.

It must not be assumed that there is an unvarying relation between the changes in the size of holdings and the changes in the number of sheep in a given territory. In New Zealand, for example, where the soil and climate are better adapted to live stock than to almost any other industry, a reduction in the size of the farms may increase the total number of sheep in the country, although the size of the individual flocks may greatly diminish, and the unit cost of wool and mutton may rise on account of the more intensive methods of husbandry. In Argentina, on the other hand, the reduction in the number of sheep in the central plains has gone on much faster than the decrease in the average size of the estates would seem to account for.

An average estate in Buenos Aires Province may still be measured by the square mile; but live stock, especially sheep, are being superseded by agricultural crops. For several years past the landlords have been encroaching on the natural grass lands by the practice of tenant farming. The owner leases a small tract of prairie land for a period of two or three years with the understanding that it shall be broken up, cultivated, and later seeded in alfalfa or left in condition for wheat raising. When this tract is brought under cultivation, the tenant takes up a new bit of raw land and so continues the round of farming. In this manner great areas of wheat, alfalfa, and corn land are being brought into cultivation annually to the detriment of the live-stock industry under range conditions.

After a few years of grain farming the contrary tendency asserts itself, and great herds of cattle with some sheep graze over the alfalfa lands. Naturally, the shift to agricultural conditions in the central plains not only has reduced the number of sheep but has changed the character of the breeding from wool types to mixed mutton breeds, such as are found in most agricultural countries. This shift toward grain crops applies to the whole period since 1900, but the tendency has been retarded since 1910. This is discussed in more detail in another section.

Further indications of the possible future of the sheep industry in the central plains as compared with the southern territories are brought out in the following tables:

TABLE LXXXI.—*Carrying capacity of sheep lands.*[a]

Districts.	Number of acres per sheep.
Province of Buenos Aires	1 acre or less.
[illegible] of Buenos Aires Province	1½ to 2½ acres.
[illegible] of Buenos Aires Province to foothills	4 to 7 acres.
[illegible] of Magellan	1 acre.
[illegible] foothills, [illegible] in width	2 or 3 acres.
Plains of eastern Patagonia	8 or 9 acres.

[a] Consular Reports of 1919.

This table, showing the carrying capacity of the land, applies to the area actually used for sheep raising. In Buenos Aires, for example, much of the land would carry more than one sheep to the acre but because of the greater profit from other uses of the land sheep are not run on it. Land within a radius of 300 miles of the city of Buenos Aires is worth from $50 to $175 per acre, whereas a value of $25 to $35 per acre is almost the limit for profitable sheep raising as the industry is now conducted in Argentina. It is also true that great areas of the country, in Patagonia and in the far north especially, will carry far less than one sheep to 8 or 10 acres. But at the present stage of development, these lands are largely [illegible] and therefore, do not enter into the table.

No figures are available for the rental value of the various classes of sheep land, but a series of rentals compiled from a slightly different point of view is presented in the following table:

TABLE LXXXII.—*Rental charges on live stock farms in Argentina.*[a]

Annual rental per acre.	Per cent of total number of farms reported.		
	Entire Republic.	Buenos Aires (10,725 farms).	Chubut (154 farms).
	Per cent.	*Per cent.*	*Per cent.*
Less than $0.08	10.0	0.9	32.5
$0.08 to $0.20	6.5	.5	16.2
$0.20 to $0.40	5.5	1.5	6.5
$0.40 to $0.80	8.0	1.2	16.2
$0.80 to $2	16.0	11.2	6.5
$2 to $4	24.0	38.0	7.8
$4 to $6	12.0	21.5	6.5
Over $6	18.0	25.2	7.8

[a] Col. House inquiry, January 1919.

From this table it will be seen that in Chubut, for example—the heart of the Patagonian country—out of 154 farms about one-fifth rented for less than 8 cents per acre, whereas in Buenos Aires less than 1 per cent out of a total of over 10,000 acres were leased for this low figure. An even 10 per cent of all farms in the Republic rented for less than 8 cents, and the other extreme is shown where 18 per cent ran over $6 per acre. In Buenos Aires, however, over 25 per cent were at this high rental. The greater number of all farms reported in the entire Republic and also in the Province of Buenos Aires rented from $2 to $6 per acre, whereas in Chubut most of them are leased at around 8 to 10 cents per acre.

From these two tables it seems probable that the future of the sheep industry of Argentina, at least so far as range conditions are concerned, lies in the southern plains. Near the Strait of Magellan there are relatively large areas carrying one sheep to the acre, and even the dry plains requiring 8 or 10 acres per head are valuable as a national asset because of their enormous extent.

A further point bearing upon the future expansion of the industry in this area, is the fact that provision for a little winter feeding will greatly increase the carrying capacity of the desert. In the driest districts good feed may be found for some months of the year, and an irrigated ranch as a base would tide over large numbers of sheep that otherwise could not be carried at all over great areas of this country.

PUBLIC LAND.

The figures for the acreage of public land in the Provinces of the Republic (as distinct from the Territories) are not available, but

those for such land in the Federal territories are given as of December 31, 1913.[2]

Out of a total area of about 300,000,000 acres in the 10 Territories, roughly, 210,000,000 acres, or about 70 per cent was public land. Much of this area is in the northern tropics or the barren mountains of the northwest, and therefore has no significance for sheep grazing. The southern Territories of Chubut and Santa Cruz had a total of about 100,000,000 acres unclaimed land out of a combined area of 120,000,000 acres. Most of this land is relatively useless, however, even for grazing purposes, and only by the spread of irrigation in the valleys will the desert uplands be worth claiming.

The following brief resumé of the land laws of Argentina gives some indication of prevailing conditions there:

Under the land law of 1903 a certain portion of the Federal land was to be divided into suitable lots, the maximum size of agricultural lots being 250 acres, and that of pastoral lots about 6,000 acres. Not more than two agricultural lots or one pastoral lot could be acquired by an individual or corporation.

The remainder of these lands was to be leased or sold at public sale, the sale price to be not less than 20 cents per acre for pastoral land, payable in five years with interest at 6 per cent. The maximum amount which could be leased or purchased by any individual or company was about 50,000 acres. Titles are granted to those paying one-sixth of the total purchase price and complying with the requirements for development, though the transfer is not made until the final installment has been paid. The purchaser must be a citizen or become naturalized within 2 years from date of sale, and must be over 22 years of age. He must settle personally, and within the first two years, must stock the property with 400 sheep or 1 cow for every 5 sheep, erect necessary buildings and plant 100 trees for each 6,000 acres. Lessees complying with these terms were allowed to purchase up to one-half the leasehold at the advertised price. From the date of the passage of this law, occupation of public lands was not recognized as giving any preferential right to their acquisition.

Immediately, about 250,000 acres of land were offered for sale in Chubut, one of the southern territories, at about 20 cents per acre plus 3 cents per acre for the cost of survey. The terms of payment were one-tenth the purchase price and the cost of survey immediately and the remainder in five yearly installments with interest at 6 per cent.

In 1916, a limited amount of Government land was still available, and the first homestead act was passed on September 28, 1917. It was estimated that the land then available for homestead purposes

[2] Argentine Yearbook, 1915–16, p. 230.

comprised about 245,000,000 acres, 80 per cent of it in the southern territories. This law, modeled somewhat after the United States homestead acts, gives from 50 to 495 acres to Argentine homesteaders or to foreigners who will become Argentine citizens. The land is inalienable, can not be mortgaged in payment of debt, and crops can be attached to only half their value.

Although practically all the valuable land in the Republic is now privately owned, there is some possibility that additional areas will be opened up for homestead purposes by the division of some of the large estates. This question is now being agitated with the outcome still uncertain. Whatever the results of this movement, it probably will not aid the sheep industry to any extent, and if the large estates are broken into relatively small farms there probably will result a considerable reduction in the number of sheep raised.

DEVELOPMENT OF THE SHEEP INDUSTRY.

The sheep industry of Argentina is, roughly, 125 years old. Prior to the year 1800 there were two varieties of wild sheep in the country; they originated in the early Spanish settlements, and were pests rather than valuable domestic animals.

Spanish Merinos were imported in the early part of the nineteenth century, and the cross of these on the native stock gave rise to the "Mestizo" breed, a name that survives to-day but which now refers especially to the finewool crosses of the Merino type. Around 1850 experiments were made with English breeds both of the Down and longwool types. The Lincoln finally became a favorite, but their acceptance was retarded for years because of their unpleasant resemblance to the wild sheep of the pampa. By 1880 the change from Merinos to crossbred types, usually a Lincoln-mestizo cross, was well under way, and the raising of mutton sheep has received more and more attention since that time.

The following table shows the development of the industry from 1830 to 1919:

TABLE LXXXIII.—*Growth of the sheep industry in Argentina.*[a]

(000 omitted.)

Year.	Number of sheep.	Pounds of wool exported.	Pounds per sheep.	Year.	Number of sheep.	Pounds of wool exported.	Pounds per sheep.
1830	2,500	6,000	2.3	1901	.....	503,438	.....
1840	5,000	13,000	2.6	1905	.....	421,094	.....
1850	7,000	21,000	3.0	1908	67,212	.....	.....
1860	14,000	45,000	3.2	1910	.....	332,011	.....
1870	41,000	137,000	3.3	1915	43,677	259,415	5.9
1880	61,000	215,000	3.5	1916	.....	259,387	.....
1890	78,000	3[illegible],000	4.0	1918	.....	229,027	.....
1895	74,380	.....	.....	1919	.....	[b] 296,087	.....

[a] Gibson, Herbert: History and Present State of the Sheep Breeding Industry in the Argentine Republic, p. 50.

[b] Estimated on 9-month basis. Last 3 months' wool exports estimated on pounds per bale.

From this table it will be seen that the industry reached its zenith about 1890, and that, according to latest estimates, the number of sheep now in the Republic is not much, if any, greater than 50 years ago. The amount of wool exported recently, however (250,000,000 to 300,000,000 pounds), is almost double the quantity exported in 1870 from about the same number of sheep. Figures for the average clip per head are not available, but inasmuch as the average was only 3.3 pounds per head in 1870 it is probable that the discrepancy between the number of sheep and the exports of wool in that year, as compared with the number of sheep and the exports at the present time, is due largely to the increased clip per head. The great decrease in number of sheep during the past 25 years is a matter of concern to wool consumers the world over. The figures mean that one more great reservoir for cheap wool, produced under extensive range conditions, has long since declined from its maximum output, and that in the future the supply will come more and more from relatively small flocks of the crossbred types.

Further details of the decrease in number and some clew to the reasons therefor are found in the following table:

TABLE LXXXIV.—*Number of sheep in Argentina.*[a]

(000 omitted.)

District.	1895	1908	1915
Northern provinces and territories	2,458	3,337	3,188
Eastern and central provinces:			
Buenos Aires	52,638	34,605	18,545
Santa Fe	1,989	969	579
Entre Rios	6,210	7,005	4,414
Corrientes	1,405	3,139	2,410
Cordoba	2,595	1,992	1,432
Territory of La Pampa	5,295	4,809	2,353
Territory of Neuquen	327	673	821
Total	70,469	53,192	30,571
Southern territories:			
Rio Negro	1,010	4,725	2,888
Chubut	47	2,184	2,114
Santa Cruz	369	2,358	4,066
Tierra del Fuego	7	1,396	887
Total	1,433	10,693	9,955
Grand total	74,380	67,212	43,677

[a] Robertson, Henry W., Consul General at Buenos Aires: Unpublished report on The Sheep Industry in Argentina, 1919.

To one familiar with the geography of Argentina, it is obvious, at a glance, that sheep are drifting from the great central plains southward into the semiarid plains of Patagonia. Twenty-five years ago the Province of Buenos Aires alone had nearly 53,000,000 sheep—10,000,000 more than the whole country now has—but in 1915 the number had been reduced to 18,545,000. On the other hand, sheep in the southern territories increased from less than 1,500,000 in 1895 to 10,693,000 in 1908, but declined to 9,955,000 in 1915.

Whether this reduction in number in the southern territories in 1915 as compared with 1908 is anything more than an accidental variation can not be determined at this time, but it is evident that because of the physical features of the country the drift southward can not go on indefinitely. The grassy region around the Strait of Magellan is already stocked almost to its carrying capacity, and the dry region to the north, i. e., Chubut and Rio Negro, though now understocked, will never carry more than one sheep to 8 or 10 acres. It is true that irrigation may double the carrying capacity locally by providing winter feed for a portion of the year, but it seems probable that this method of husbandry can never make good the loss of nearly 40,000,000 head since the high point of 1890.

So pronounced has been the decline in number that even the shift to mutton types fostered by a good market for frozen meat has not greatly retarded it—at least mutton production has recently made little headway, according to the export statistics. The highest peak for mutton exports seems to have been reached around 1905 and 1911 when between 80,000 and 90,000 tons were exported. The recent average has been about 60,000 tons.[3]

COMPETITION WITH OTHER INDUSTRIES.

The large immigration to Argentina during the last 20 years has brought into the Republic great numbers of people with agricultural interests. These colonists have taken the native land as tenants on large estates, and have cultivated tracts of a few hundred acres. After a few years of such culture the land is taken over by the landlord and sown to alfalfa to be used for cattle grazing, while the tenant takes a new piece of land and proceeds to add to the acreage under cultivation. By 1915 this had increased to 60,000,000 acres, and there has been a gradual increase since then.

About 45 per cent of the area thus broken up was planted in cereal crops and 41 per cent in forage.[4] The principal crops are wheat, oats, linseed, maize, and alfalfa. Alfalfa is now the chief crop in area sown and furnishes forage for the herds of cattle which feed the great refrigerating plants. In 1910 there were about two and one-half million acres less in alfalfa than in wheat, but within three years alfalfa had exceeded wheat in acreage and has done so ever since.[5]

In 1876 the first experiment was made in shipping frozen meat from the districts about the River Plate. Previous to that time there had been no outlet for the surplus stocks of beef, and millions of cattle had been slaughtered for their horns and hides alone. By 1883 the

[3] See detailed figures in Table LXXXVI, p. 402.
[4] National Chamber of Commerce Bulletin.
[5] Pan American Union, figures for 1918.

feasibility of shipping frozen meat had been proved and several packing establishments were already completed. The history of this industry has been one of marvelous development, and it is due largely to this trade that the number of sheep has gradually decreased in the regions of the great frigorificos, or meat-packing establishments. It is true that mutton as well as beef finds its way to the slaughter-house, but since 1900 exports of frozen or chilled beef have risen steadily while mutton exports have remained fairly stationary, with noticeable decreases from time to time. It is only recently that pork has been shipped in quantities, but this branch of the industry is increasing. Most of this meat goes to Europe, the greater part of it to the United Kingdom.

Tables LXXXV and LXXXVI show the most recent figures available for the number of agricultural live stock in the Republic, and exports of wool, beef, mutton, and agricultural crops since 1900.

TABLE LXXXV.—*Number of live stock in Argentina.*[a]

Animals.	1895	1908	1914	Animals.	1895	1908	1914
Cattle	21,702,000	29,124,000	25,867,000	Pigs	653,000	1,404,000	2,901,000
Sheep	74,380,000	67,384,000	43,225,000	Goats	2,749,000	3,947,000	4,325,000

[a] Commerce Report Supplements, Feb. 23, 1918.

TABLE LXXXVI.—*Exports of the principal products of Argentina.*[a]

[000 omitted.]

Year.	Wool.	Beef.	Mutton.	Wheat.	Maize.	Linseed.	Oats.
	Pounds.	*Pounds.*	*Pounds.*	*Bushels.*	*Bushels.*	*Bushels.*	*Bushels.*
1900	[b] 503,438	54,211	124,366	70,903	28,079	8,789	825
1905	421,094	336,989	172,733	105,390	87,487	25,778	1,183
1910	332,011	559,325	165,570	69,209	104,727	23,813	25,556
1911	291,087	689,674	189,410	83,993	4,928	16,369	35,232
1912	363,680	755,849	154,708	96,600	190,354	20,290	61,731
1913	264,728	807,388	101,253	103,328	189,239	40,027	61,298
1914	258,533	813,427	129,384	36,028	139,452	33,132	24,368
1915	259,415	799,694	77,238	92,281	170,486	38,627	40,840
1916	259,387	942,907	113,136	91,821	113,140	25,192	55,421
1917	280,937	870,458	87,787	34,385	35,192	5,563	18,719
1918	229,027	1,092,633	111,145	110,098	26,167	15,408	37,347
1919	296,087	865,231	134,660	115,056	91,730	32,290	21,811
1920	292,524	.....	.....	.....	.....	.....	.....

[a] Figures for 1900-1918, inclusive, from El Comercio, Exterior Argentina for 1918. Figures for 1919 from Review of the River Plate, Jan. 9, 1920.
[b] Exports of wool for 1901.

The underlying causes for the decline in sheep raising in Argentina are fairly evident from the foregoing tables. The exports of wool and mutton reached their highest from 1900 to 1905 (although the number of sheep has been declining since 1895) but the exports of beef and cereal crops have been increasing since 1900. As early as 1913 the exports of beef were in excess of 800,000,000 pounds and in 1918 they ran over a billion pounds. Wheat has recently exceeded 100,000,000 bushels, while linseed and oats seem to have held their own.

The great decrease in maize exports during the war is interesting because it probably does not represent any great reduction in the corn crop but rather the result of heavy feeding to hogs and cattle. A further indication of the spread of intensive agriculture is given in the following figures for the exports of dairy products.

TABLE LXXXVII.—*Exports of butter and cheese from Argentina.*[a]

Year.	Butter.	Cheese.	Year.	Butter.	Cheese.
	Pounds.	*Pounds.*		*Pounds.*	*Pounds.*
1911	3,076,740	1,102	1916	12,502,172	501,987
1912	8,105,653	4,189	1917	21,671,558	6,015,031
1913	8,343,079	15,432	1918	41,821,262	14,177,253
1914	7,675,661	8,157	1919	45,547,036	21,073,749
1915	10,191,152	13,448			

[a] Figures for butter for 1911 and 1912 are from Tornquist's Business Conditions in Argentina, Aug. 1918; for 1913-1917, inclusive, Report of Pan American Union. Figures for cheese for 1911 to 1917, inclusive, Tornquist's Business Conditions in Argentina for Dec. 30, 1918. All figures for 1918 and 1919, El Comercio Exterior Argentina, 1919, estimated on figures for the first 9 months.

An increase in the exports of butter and cheese from something over 3,000,000 pounds in 1911 to nearly 70,000,000 pounds in 1919 marks a development in the dairy industry. Although this increase no doubt was largely due to war conditions, much of the gain is probably permanent. These figures are more significant in their relation to the sheep industry than may appear at first sight, because dairying represents an advanced stage of agricultural development and one with which sheep can not compete except under intensive methods of sheep husbandry. On the whole, it is probable that wool and mutton will never again occupy the prominent place in the exports of Argentina, either relatively or absolutely, that they once maintained.

FLOCK MANAGEMENT.

About 75 per cent of all Argentine wool is of the longwool type, and comes from the crosses of Lincoln and Leicester on various kinds of flock sheep. When sorted, this wool grades largely into coarse and medium crossbred, corresponding to domestic crosses and quarter-blood in the United States.

Late figures on the number and various breeds of sheep are not available. In 1914 the numbers of pure-bred stock of the principal types were as follows:

TABLE LXXXVIII.—*Number of pure-bred sheep in Argentina in 1914.*[a]

Breed.	Number.	Breed.	Number.
Lincoln	425,907	Southdown	14,538
Rambouillet	156,976	Leicester	5,301
Shropshire	20,082	Other breeds	23,185

[a] Consul General's Report, July 9, 1919.

Although the Romney Marsh does not appear in this table, it is rapidly growing in prominence, and the total value of those bred in the Republic is probably greater than the value of the Shropshire Downs.[6] Merinos are more popular in the southern territories and the long wools in the central and eastern Provinces. According to Mr. Herbert Gibson, sheep expert of Argentina, if the seaboard markets are easily accessible, or if the climate is damp and the soil inclined to be swampy, the long wool is the best type, as these sheep thrive well in such districts, and the mutton market is of equal importance with that for wool. On the other hand, if markets are difficult of access because of distance or of undeveloped transportation service, or if the climate is dry, Merinos, particularly the Rambouillet, are the type best adapted. The production of mutton is then of secondary importance, and climatic conditions are favorable for the production of fine fleeces.[7]

The fine stud farms of Buenos Aires and other central Provinces are princely in their size and equipment. Most of these are owned by native Argentinos of Spanish descent, gentlemen farmers whose homes are supplied with every comfort and convenience. The estates, as a whole, often resemble a small village with its groups of buildings and population of workers. It is from such estancias, or ranches, that pure-bred stock goes to improve the flocks of the Republic.

The typical sheep camp of Argentina, especially in the central part, occupies hundreds and often thousands of acres of level land. Except for groups of trees planted along avenues or about the living quarters the great ranches are treeless. There are very few water courses over large areas of the Provinces, and no ponds or pools are to be seen around the estancias. Wells or bore holes furnish the stock with water, and over these are American windmills, from which radiate galvanized-iron troughs for the sheep or cattle.

The fields are fenced into pastures of various sizes, from 100 to 5,000 acres, where sheep and cattle usually graze together. These fences are erected at great cost because the wood for the posts must be brought from the northern forests. The wires are passed through the posts instead of being stapled and also through the upright sticks which keep them the proper distance apart, for the posts are set at considerable intervals. The wires are smooth, though there may be one barbed wire at the top. The gates are wide and strong.

The buildings usually consist of a dwelling for the manager, an office for the bookkeeper, a coach and harness house, shearing shed, and the sheds for a few choice rams and ewes. Accommodations for sheltering sheep are very limited, for they live outside in the pas-

[6] Consul General's Report, July and August, 1919.
[7] Gibson, Herbert: Op. cit., pp. 57, 58.

tures the year round. There are also huts or cottages for the laborers and in each pasture a hut for the peon, or laborer, who has charge of the animals and fences.

The shepherds are usually native Argentina peons or Basques. In ordinary times there is little work to be done by these men, because the fences are well built and seldom need repair. Once an estancia is well equipped, the cost of maintenance is low. The shepherds manage the sheep from horseback. The custom of separating the flocks prevails, and on most of the establishments a maximum of 1,200 sheep is given to each shepherd. This number varies considerably, however, according to the location and area of the ranch, the bands being smaller in the territories of the south than in the northern plains which are under the paddock system.

The lambs are usually born late in the fall, that is, in May or June in that latitude; or they may be born in the early spring. Eighty-five per cent is considered a good crop, although 100 per cent is sometimes secured. In times of prolonged drought a lamb crop is not raised, as it would weaken the underfed ewes.

There are practically no pests, except a few foxes in the south, and scab is the only disease which causes much difficulty. Dipping is continued throughout the year.

Grass grows at every season, and the sheep are seldom fed seeded crops, although oats are sometimes sown in the fall for winter grazing, and at times grasses and alfalfa are fed.

Shearing comes in October, November, and December, and is done by machinery, except in remote districts or where the flocks are very small. The shearers go about from camp to camp during the shearing season, much as they do the world over, and the whole shearing operation is similar to that of Australia or New Zealand. Seventy-five head per man is a good day's clip, although 100 head is not unusual for some machine shearers. Packing is done on the largest estancias by steam presses, making bales of 500 pounds for export; in the southern part of Argentina wool is packed by hand presses into bales of 350 to 450 pounds; in Buenos Aires and the western and northern Provinces it is almost always shipped loose in sheets for sale in the Buenos Aires market.

COST OF PRODUCTION.

No detailed studies on the cost of running sheep in Argentina were made by the Tariff Commission, but through the efforts of the American consul general in Buenos Aires some data may be presented under this head.

The figures below are estimates only, but inasmuch as they were prepared by men familiar with local conditions they are trustworthy as far as they go.[a]

INVESTMENT ITEMS.

Estimated expenses and receipts on 12,350 acres supporting 25,000 sheep in the Province of Buenos Aires in 1919:[c]	
Rent, 12,350 acres, at $5.15 per acre per annum	[b]$63,600.00
Manager's salary, at $170 per month	2,040.00
Wages for 10 peons, at $21.25 each per month	2,550.00
Staff—18 men, at $15.30 per month each	2,386.00
Repairs—upkeep	850.00
Stores for 4 dippings a year	4,245.00
Shearing—$0.064 per head on 35,000 head	2,240.00
Total	77,911.00
Receipts—	
Wethers, 4,000, at $7.65	30,600.00
Dry ewes, 4,000, at $6.35	25,400.00
Skins, tallow, etc	4,246.00
Wool from 25,000 sheep at 8.8 pounds each; 220,000 pounds at $0.40	88,000.00
Wool from 10,000 lambs at 3.3 pounds each; 33,000 pounds at $0.40	13,200.00
Total	161,446.00
Estimated cost of wool per pound[d]	.23
Investment, expenses, and receipts of a 49,400-acre ranch for 8,000 sheep in one of the national territories; distance from the nearest port 125 miles:	
Investment—	
House for manager or owner	2,547.00
Wire for fencing for about 19 miles, at $375	7,218.00
Wagons (1 Ford, 2 carts, 30 horses)	3,821.00
Measurement of land	849.00
6,400 sheep, ewes and some rams at $3.40 each	21,760.00
Total	36,195.00
Yearly expenses—	
Salaries, 1 overseer and 3 laborers	2,547.00
Rent	679.00
Sheep dips	2,972.00
Food, including that of shearers, say for 6 men	2,123.00
Freight on wool and sheepskins at $0.042 per pound	1,698.00
Total	10,019.00

[a] Consul General W. Henry Robertson, to whose unpublished report on the "Sheep Industry in Argentina" repeated reference is made in this chapter, explains the methods of obtaining estimated costs as follows: "Some weeks ago I addressed the following inquiries to two experts here, one interested in sheep raising in the Province of Buenos Aires and the other having his properties in the southern territories." After this preliminary explanation the form of the questionnaire sent out is shown but it is unnecessary to reproduce it here.

[b] Report of Consul General at Buenos Aires, August, 1919.

[c] Conversion at par: $1 Argentine gold equals $0.9648 United States gold.

[d] The estimated cost of wool per pound was determined by allocating to the wool produced a share of joint expenses based on the ratio of the receipts from wool to the total of all wool.

Yearly income—	
Wool at $0.40 per pound	$11,645.00
New lambs, 60 per cent at $2.15	7,252.00
Total	18,897.00
Estimated cost of wool per pound [c d]	.21

It will be observed that these two sets of figures are not actually comparable. For example, the amount of the investment in sheep and equipment is given for the ranch in the southern territories, but nothing of the sort is given for the Buenos Aires establishment. There may be some question as to whether the interest on the investment in each case should be included in cost, but certainly the value of 25,000 sheep, worth $8 or $10 per head, and the value of the necessary equipment, perhaps amounting to thousands of dollars, should not be left out of consideration in any survey of the situation. The permanent equipment—such as barn, sheds, and fences—is presumably included in the rent of land for the Buenos Aires estate. Many incidental expenses are also omitted, such as the charge for food, taxes, insurance, and other items which may be small individually but large in the aggregate. The expenses of feeding the working force on a large estate may run into several thousand dollars a year, because it costs $15 or $20 a month for a single shepherd or peon on the range.[e]

The receipts are probably larger than from the average flock in Buenos Aires. The whole 25,000 sheep are assumed to average 8.8 pounds of wool per head, an improbable record in a herd so large, or at least one not reached by the ordinary flocks in the Province.

As a result of the low estimate of expenses and high estimated yields, profits are high in both cases. In Buenos Aires an expense of about $78,000 yields a gross return of over $160,000. In the territories an investment of $36,000 with an expense of $10,000 yields a return above $18,000. Furthermore, of the total expense of about $78,000, $63,600 is for the rent of land at $5.15 per acre, but in the case of the territories the rent is negligible—$679 for the whole ranch.

[c] The estimated cost of wool per pound was determined by allocating to the wool produced a share of joint expenses based on the ratio of the receipts from wool to the total of all wool.

[d] The similarity of the estimated costs of wool per pound in the two cases is probably a coincident rather than the result of accurate estimates.

[e] How large the charge for food may be is indicated by the following quotation:

"In order to satisfy the peon's hunger an entire sheep is allotted daily as the portion of seven men. Thus, the hundred laboring visitors (shearers) at the end of their fortnight's stay will have consumed more than 600 sheep, a feat that places them almost on a level with such phenomena as a drought or some other natural scourge. * * *

"The question of food for permanent hands upon an estancia is a sufficiently weighty one when worked out in hard and fast avoirdupois. At certain estancias, for instance, each peon's family is supplied with an entire sheep every second day." Argentina, Past and Present, by W. H. Koebel, London, 1910, pp. 225 and 228.

The heavy charge for rent of the Buenos Aires ranch raises the question as to how much of the charge is actually a part of the cost of running sheep, especially if it be assumed that the land is owned by the flockmaster. In other words, the question arises as to how heavy a "loss" the farmer could incur and still have a net income from operations. Without entering into the dubious relations of rent to cost of production, it may be said that in the Province of Buenos Aires any serious reduction of income below the total of expenses in which imputed rent is included would probably result in a reduction in the number of sheep, because of the competition of other industries for the use of the land.

The cost of wool per pound can not be determined accurately from these figures (nor from any other data for that matter, where sheep are also regularly marketed) because of the joint production of wool and mutton; but if the expenses are distributed to each of the two products in proportion to the receipts from each, some approximation of the cost of each product may be made. Thus when the receipts for wool are, roughly, about $100,000 and for sheep about $60,000, as they are in the first case, we may, with some propriety say that the wool should bear ten-sixteenths of the total expense or about $57,500 out of a total of nearly $78,000. Under this assumption the 253,000 pounds of wool produced cost almost 23 cents per pound. By the same method of calculation the cost per pound in the second case (southern territories) is about 21 cents. These two figures of cost are remarkably close together in view of the fact that they are based on returns made by different men for different parts of the country, and are derived from a joint process of production—wool and mutton. The possibilities for differences and errors are so many that the similarity of the estimates should be taken more as a coincidence than as the result of accurate calculations.

Further cost estimates are presented below. In this case they represent the estimated cost per pound of Santa Cruz wool (in the far south) delivered in the United States both before the war and in 1919.

TABLE LXXXIX.—*Cost per pound of Santa Cruz wool delivered in the United States.*[a]

[Exclusive of all commissions.]

Period.	General expenses.	Rent.	Cartage to coast.	Freight. to Buenos Aires.	Baling charges.	Export duty.	Ocean freight.	Total.
Prewar	$0.060	$0.020	$0.015	$0.010	.....	$0.010	$0.010	$0.145
1919	.120	.020	.015	.020	$0.030	.035	.015	.254

[a] Report of consul general at Buenos Aires, July 9, 1919, pp. 18 and 19.

The total estimated cost of 25 cents a pound for this wool is not to be compared with an estimated cost of 23 cents a pound in the Province of Buenos Aires, given on page 406, because in the latter case there is added to the range cost of the wool, freight, baling charges, export duty, and ocean rates, which are estimated at 10 cents a pound, leaving only 15 or 16 cents as the actual cost of producing the wool.

Wage data are not available for all the sheep-raising districts of Argentina. The consul general reports the following rates of pay for the southern territories:

TABLE XC.—*Wages of employees on sheep farms in southern Argentina, 1919.*[a]

Class of employee.	Rate of pay per month.	Class of employee.	Rate of pay per month.
Manager	$85.00-$425.00	Carpenters	$63.50
Bookkeeper	95.00	Flockkeepers	42.50
Overseers	85.00	Shepherds	42.45
Mechanics	85.00	Peons	38.25
Cooks	68.00	Unskilled laborers	31.85

[a] Report of Consul General, July 9, 1919, p. 20.

The cost of feeding a shepherd or peon ranges from $10 to $15 per month in the Provinces and from $14 to $20 in the southern territories. The meat is usually furnished by the ranch, other articles being bought and charged to the laborer's account.

The cost of pasturage may be from $2 to $5 per acre in the case of lands privately owned where there is good natural grass pasturage, but in the south where much of the land is still owned by the Federal Government, rentals are very low, about one-third of the stock farms in Chubut renting at less than 8 cents per acre.

Grass grows at every season and very little artificial feeding is done. Dry alfalfa is sometimes used for the better classes of breeding sheep. The cost of alfalfa varies according to the district in which it is grown, from $11.50 to $21.25 per metric ton (2,204 pounds).

METHODS OF MARKETING.

The Mercada Central de Frutos, Avellaneda, in the city of Buenos Aires, is the largest wool market in the world. Wool is generally consigned by the growers to brokers in this market, where foreign buyers and buyers from the local mills may examine and purchase it, although some of each season's clip is sold direct by the producers to exporters. A considerable quantity of wool is similarly consigned to brokers in Bahia Blanca, down the coast from Buenos Aires, and to Rosario about 200 miles up the River Plate where it is sold and shipped to different parts of the world. In the southern part of Argentina, before the recent war, practically all the wool was s-

from the ranches to Punta Arenas, Chile, by small steamers and then shipped on trans-Atlantic vessels directly to English ports. In the London markets the wool of each ranch was known according to the manner of its preparation for export. Since the war, however, most of the Patagonian wool has gone to the United States, about half of it being shipped by way of Punta Arenas and the other half forwarded from Buenos Aires.

Wool received at the Central Market in Buenos Aires is classified for sale into (1) fine Lincoln cross; (2) medium Lincoln cross; (3) coarse Lincoln cross; (4) fine mixed Rambouillet. These classes are subdivided according to condition, quality, staple, source, weight, and the amount of foreign substance contained. The wool is generally classed in the warehouses and not in the market into fleece wool, belly wool, and crutchings. Little attention is paid to sorting, for the commission agents who go through the stocks on hand and take such lots as contain the grades wanted.[10]

Wool trading is financed chiefly through credits opened in Buenos Aires in favor of the agents or representatives buying for foreign account, or in favor of the local mills, and certain banks make this sort of financing a specialty. The trading is done:[11] (1) By middlemen who buy wool from the estancias often on the sheep's back, and sell it to the Buenos Aires market; (2) by experts who buy wool from the producers or middlemen and send it to the markets or factories of the United States and Europe; (3) by United States or European consumers who send their representatives to buy in the Argentine market.

Wool growing, as distinct from wool marketing, was formerly financed largely by wool brokers and by the banks in Buenos Aires which loaned money up to about 50 per cent of the value of the clip. This practice involved the usual difficulties that arise, especially in slack times, when lenders are also purchasers of commodities, and prior to the war much dissatisfaction with the financial situation was current among flockmasters. Two circumstances, however, have alleviated the trouble to a considerable extent. One was the great increase in the profits of the growers during the war, which rendered them relatively independent of the banks and wool brokers, and the other was the agrarian pledge law of October, 1914.

This law provides, among other things, for cash loans to farmers under guarantee of machinery, animals and their products, or produce of any other nature, corresponding to the agricultural year in which the contract is made, whether such be pending, on the hoof, or after separation from the plant, as also wood and timber, mineral

[illegible]

[illegible]

products, and products of national industries.[12] The law does not contemplate Government loans for the aid of agriculture, but rather private contracts which shall be recorded in public registers opened in national and provincial offices and which shall be transferable by indorsement to any purchaser. The certificates of indebtedness expire automatically in two years from the date of registration, but the debtor may pay off the loan at any time by remitting through the proper banking channels to the legitimate holder of the certificate. The chief advantage of this system is that it provides a credit instrument publicly recorded, well secured, and negotiable throughout the country, and in this respect is similar to the commercial acceptances which facilitate the marketing of most manufactured commodities.

Most of Argentina's wool is shipped in the grease, though more is being scoured for export now than formerly. In the year 1918, there were in operation 14 wool-washing establishments which scoured a total of over 37,500,000 pounds of wool. Of this amount, more than 27,500,000 pounds were for export and nearly 10,000,000 pounds for domestic consumption. This represents around 62,000,000 pounds of raw wool, or some 20 per cent of the total production.[13]

Further details of wool-washing operations are shown in the following table:

TABLE XCI.—*Wool washed in Argentina.*[a]

Year.	For domestic consumption.	For exportation.	Total.	Year.	For domestic consumption.	For exportation.	Total.
	Pounds.	*Pounds.*	*Pounds.*		*Pounds.*	*Pounds.*	*Pounds.*
1913	6,393,340	.....	6,393,340	1916	7,496,640	8,602,349	16,097,989
1914	5,070,580	.....	6,172,880	1917	8,597,940	17,833,009	26,430,949
1915	6,613,800	.....	6,613,800	1918	9,920,700	27,583,955	37,504,655

[a] From report of Consul General W. Henry Robertson, Buenos Aires, Argentina, Aug. 19, 1919.

This table shows the great increase in scouring operations and it also indicates the probable reasons for the increase. Prior to 1916 no wool, apparently, was shipped except in the grease, but since then the increase has been rapid. This change was due largely to the necessity of conserving shipping space during the war. Whether the scouring industry will continue to develop or even hold its own in the future is problematic, but inasmuch as the technical and financial difficulties incident to establishing the industry have been largely overcome there may be a continued development.

[12] Argentine Yearbook, 1915–1916, p. 113.

[13] For further discussion of this subject see La Prensa, Aug. 18, 1919, quoted in Consul General's Report, Aug. 19, 1919.

There was no direct control of the wool market of South America during the war, but the control of prices by Great Britain and the United States had a great effect on the Argentine market. Not long after the United States entered the war, it announced that it might, at any time, exercise the option to take all wool imported from South America at a fixed price. It did not exercise the option for some time, but the continuing possibility of such action influenced the South American market.

The general scarcity of wool in 1917 as well as of other agricultural products counteracted any downward tendency of the market and the resulting high prices led Argentina to take some measures to control her products through an export tax. This tax was promulgated on January 18, 1918, and was adopted to supply the deficiency in revenue which came about through lessened receipts from import duties. Certain basic prices for different commodities—about 35 in number, chiefly agricultural products—were fixed in the law, and the tax was levied upon the difference between the basic price and the appraised price of the export commodity.

The tax was 12 per cent of the difference between these two prices for direct agricultural products, and 15 per cent for frozen meats and other products listed which were advanced slightly in manufacture. The exceptions to these rates were wheat flour at 6 per cent and canned meat at 7½ per cent. The appraised prices of all products, including wool, changed from time to time; but in round numbers the export tax on wool for the year 1918 was about 5 cents per pound, and from 3 to 3½ cents in 1919. In the fall of 1920 a bill for the exemption of wool, hides, and certain other products was sanctioned by the Chamber of Deputies, and it seems probable that these duties will be repealed in the near future.

PRICES.

It is impossible to give a significant average price for Argentine wool because of the differences in the qualities grown, but quotations for various classes may be seen in the following table:

TABLE XCII.—*Prices of wool in Buenos Aires.*[a]

[Per pound in the grease.]

Grade.	August, 1914.	August, 1915.	August, 1916.	March, 1917.	January, 1918.	August, 1918.
Concordia superior crossbred						$0.5734
Superior crossbred	$0.2121	$0.2669	$0.3179	$0.4046	$0.6167	.6520
Good average crossbred	.1734	.2214	.2669	.3277	.5308	.6331
Inferior crossbred	.1543	.1543	.2023	.2503	.4437	.3688
Concordia superior Merino						.4734
Superior Merino	.1832	.2121	.2601	.3277	.5308	.4144
Good average Merino	.1347	.1543	.2023	.2890	.4820	.3883
Inferior Merino				.2312	.3855	.2798
Inferior Patagonian	.1445	.1734	.1734			

[a] Compiled from Financial Conditions in Argentina, Tornquist, Jan., 1918, to May, 1920, inclusive. Conversions at par; 1 peso equals $0.425 American gold.

TABLE XCII.—*Prices of wool in Buenos Aires*[a]—Continued.

Grade.	December, 1918.	April, 1919.	July, 1919.	October, 1919.	Jan. 31, 1920.	May, 1920.
Concordia superior crossbred	$0.5398	$0.5156	$0.5784	$0.5496	$0.6652	$0.5397
Superior crossbred	.4144	.4244	.4244	.4046	.4144	.3663
Good average crossbred	.3277	.3277	.3663	.3375	.2890	.3277
Inferior crossbred	.3085	.2890	.2988	.2890	.....	.1636
Concordia superior Merino	.4628	.4144	.4820	.4531	.6663	.5589
Superior Merino	.3757	.3663	.3668	.3952	.4335	.3757
Good average Merino	.3081	.2988	.3085	.3468	.3855	.3277
Inferior Merino	.2699	.2601	.2792	.2699	.3277	.3757

[a] Compiled from Financial Conditions in Argentina, Tornquist, Jan., 1918, to May, 1920, inclusive. Conversions at par; 1 peso equals $0.425 American gold.

The peak of high prices seems to have been reached around the first part of 1918 when 50 to 60 cents per pound in the grease was the usual price. The Buenos Aires Herald of September 9, 1917, reported that during the week ending June 30, 1917, one firm in Buenos Aires sold 17,600 pounds of wool at $0.675, United States gold, per pound. It is believed that this is the record price for Argentine wool f. o. b. Buenos Aires. Prices held fairly well until May, 1920, when in common with other sheep-growing countries of the world, the price drop set in and during the latter part of the year the market was stagnant and quotations largely normal.

The prices of Argentine wool laid down in the United States are of even more importance for present purposes than the prices in Buenos Aires. For this reason a table of Argentine wool prices in Boston is reproduced for certain months of 1919, 1920, and 1921:

TABLE XCIII.—*Prices per pound of Argentine wool in Boston.*[a]

Grade.	October, 1919.	January, 1920.	May, 1920.	October, 1920.	November, 1920.	December, 1920.	January, 1921.
Crossbreds high one-quarter blood (grease)	$0.69	$0.57½	$0.42	$0.28	$0.24½	$0.20	$0.20
Straight one-quarter blood	.60	.47½	.31½	.20	.18½	.17	.17
Lincoln (grease)	.47½	.40	.27	.16	.15	.12	.12

[a] Prices quoted from the Journal of Commerce and the Daily News Record near the 15th of each month.

The outstanding feature of this table is the fact that the prices for January, 1921, are almost exactly one-third of the prices for the various grades in January, 1920, and are considerably less than one-third of the high peak reached in October, 1919.

In connection with the recent low prices of Argentine wool in the United States it is of some interest to consider the quantity of imports for the same periods. These figures are given in Table XCIV.

TABLE XCIV.—*Total wool imports into the United States from Argentina.*[a]

October.		November.		11 months ending in November.	
1919	1920	1919	1920	1919	1920
Pounds.	*Pounds.*	*Pounds.*	*Pounds.*	*Pounds.*	*Pounds.*
16,194,000	2,890,000	14,444,000	5,947,000	129,905,000	69,106,000

[a] Monthly Summary, U. S. Dept. of Commerce.

It seems certain from this table that the recent low prices are not due to heavy imports from Argentina, because in October and November of this year (1920) the imports were only about one-fifth of what they were for the same months in 1919, and the Argentine imports for 11 months ending November, 1920, are about one-half of those for a similar period in 1919. In other words, the recent low prices are not the result of heavy imports, but the small imports are probably the result of low prices in this country.

DISTRIBUTION OF ARGENTINE WOOL.

Before the war most of the wool from Argentina went to Germany, France, the United States, and Belgium. A good part of the wool was scoured in these countries and reexported in clean condition. The following table gives the distribution of exports to the various countries:

TABLE XCV.—*Wool exports of Argentina, by country of destination.*[a]

Country.	1910	1911	1912	1913	1914	1915
	Pounds.	*Pounds.*	*Pounds.*	*Pounds.*	*Pounds.*	*Pounds.*
Germany	67,227,072	76,226,250	106,808,461	87,551,280	66,988,976	.....
Belgium	36,777,137	30,227,271	35,068,572	22,248,823	19,374,026	.....
United States	23,139,482	17,001,875	37,035,075	19,519,528	37,698,660	113,781,611
France	129,998,648	113,572,174	112,857,883	81,270,374	52,456,252	39,603,434
Italy	4,195,354	4,466,520	8,060,018	6,485,933	15,068,441	43,505,576
United Kingdom	35,132,506	44,929,748	56,902,931	40,626,369	59,290,512	36,155,440
Japan	.....	.....	.....	.....	.....	.....
All other	35,540,357	4,662,729	6,946,695	7,026,060	7,656,576	26,369,221
Total	332,010,556	291,086,567	363,679,635	264,728,367	258,533,442	289,415,282

Country.	1916	1917	1918	1919	[b] 1920
	Pounds.	*Pounds.*	*Pounds.*	*Pounds.*	*Pounds.*
Germany	.....	.....	.....	.....	25,164,000
Belgium	.....	.....	.....	30,899,951	105,593,983
United States	158,296,894	195,010,996	154,097,131	104,221,324	70,318,828
France	24,830,410	26,834,391	38,794,346	76,314,392	12,927,839
Italy	23,485,604	19,346,365	15,445,428	17,785,550	17,798,296
United Kingdom	28,430,522	20,011,154	4,171,103	31,390,954	40,987,217
Japan	.....	5,257,971	3,849,232	.....	.....
All other	24,343,193	13,478,924	12,667,632	66,374,469	18,733,416
Total	259,386,623	280,938,791	229,024,872	326,976,640	292,523,809

[a] Figures are for wool in the grease. 1910-1918, inclusive, El Comercio Exterior Argentina; 1919, Review of the River Plate, Jan. 9, 1920. The increase in exports after 1914 for "All other countries" is probably due to purchases made by Germany and listed as "orders."

[b] Quoted from Review of the River Plate, Oct. 8, 1920, p. 982. It is possible that these figures are not exactly comparable with similar figures in the table for previous years.

One significant point in regard to this table is the fact that coincident with the cessation of exports to Germany and Belgium the amount of wool purchased by "all other countries" increased from a normal six or seven million pounds to about 25,000,000 in 1915 and 1916. This increase is probably due to purchases made by Germany and listed as "orders."

Another striking coincidence is the threefold increase in the exports to the United States, or fourfold increase when exports were completely cut off from northern Europe. Prior to the war the United States imported 20,000,000 to 40,000,000 pounds annually from Argentina, but in 1915 the imports reached over 113,000,000 pounds, and in 1917 almost 200,000,000. Since that time there has been a decline, and for the year ending September 30, 1920, the imports were only 70,318,828 pounds.

Again, coincident with the falling off of American imports, began the drift back to northern Europe. In 1919, Belgium took 30,889,951 pounds, and in 1920 105,593,983 pounds. No imports are recorded for Germany in 1919, but in 1920 exports to the amount of 25,164,000 pounds went to Hamburg and Bremen.

THE PRESENT SITUATION.

During the latter part of 1918 and the whole of 1919 stocks of wool rapidly accumulated in Argentina. No accurate figures are available for the amount on hand, but it seems safe to place the figure at something less than 200,000,000 pounds, or about two-thirds of a normal clip, as of December 1, 1920. In addition to this amount of old wool the clip for 1920 is largely unsold. Throughout the year 1920 the prices of coarse wools were more or less nominal and little interest was shown. The inactivity resulted in a movement between the growers in the coarse-wool districts of Buenos Aires and the wool brokers to obtain Governmental assistance in marketing the wool in Europe at reasonable prices for a credit period of two years. The national banks, according to the plan, are to finance the operations by discounting the commercial paper arising from the transactions.

In order further to alleviate the situation, a movement is on foot for the exemption of wool from export duties and for authorizing the banks to finance wool transactions in such a manner as to assist in the disposal of the great stock on hand.

PART IV.

TARIFF PROBLEMS IN THE WOOL-GROWING INDUSTRY.

CHAPTER 17.

HISTORY OF THE WOOL TARIFF IN THE UNITED STATES.

The modern form of the wool tariff in the United States began when the "compensatory" system was adopted. There were various duties on wool and woolens in the tariff acts before that time, but there is no connecting thread running through the history of the wool duties before the Civil War. Apparently there was no attempt before 1861 to fix a ratio between the duty on wool and that on woolen goods. Briefly, the history of wool duties in this country before the Civil War was as follows:

EARLY TARIFF ACTS.

The first tariff levied by the United States Government imposing a duty on wool was enacted in 1816. It placed a duty of 15 per cent ad valorem on wool and 25 per cent ad valorem on woolen goods.[1] The wool-growing industry in this country was not of great importance until the nineteenth century. The colonists had kept some sheep, but little attention was bestowed on the flocks and the natural conditions did not favor careful husbandry. During the years 1800 to 1815 large numbers of Merino sheep were imported from Spain, and the industry made considerable progress. The famous Vermont Merino was later developed from sheep brought over in 1802 by the retiring American minister to Spain, Col. David Humphreys, of Connecticut.[2] The War of 1812 stimulated the domestic manufacture of woolens and caused a great increase in woolgrowing.

After that war there was a period of depression in British industry, and wool manufacturing was seriously affected by the general conditions. Large quantities of British woolens were imported into the United States, and a great many newly established wool manufacturing concerns of this country were forced out of business.[3]

[1] Tariff Acts of the United States, 1789 to 1909, p. 57.

[2] Vermont Atwood Merino Sheep Association, Vol. I, pp. VII, X, XII, XIV, XVI, 781 ff, 790, 794 ff, 809, 811, 818; see also Special Report on the Sheep Industry, U. S. Bureau of Animal Industry, 1892, pp. 257 ff, 281 ff, 290 ff; Fine Wool Husbandry, by H. S. Randal, 1862, pp. 49 ff.

[3] Taussig, F. W.: Tariff History of the United States, 6th ed., p. 40.

Sheep raising was practically stationary during these years of depression. Between 1816 and 1820 many Merino sheep were slaughtered and the quality of the flocks deteriorated.

In 1824 the rates levied on wool were 15 per cent when valued at not more than 10 cents per pound; and on wool of higher value, 20 per cent the first year, 25 per cent the second year, and 30 per cent thereafter.[4] The duties on woolens averaged about 33⅓ per cent.[5] The price of wool was low in this country until 1830, but there was still sufficient interest in sheep raising to cause the import of nearly 3,000 Saxony Merinos in 1826. At the time of the passage of the act of 1824 our domestic output of wool was, as it has been ever since that time, insufficient for our manufacturing industry and very little was suitable for use in making the finer classes of goods. We imported fine wools from Portugal, Spain, and Germany and coarse wools from Turkey and elsewhere.[6]

In the tariff act of 1828 a combination of specific and ad valorem duties was tried, the rates levied being an increase over those of 1824.[7] In 1832 the rates were reduced, and in 1833 all wool was admitted free and remained on the free list until 1841.[8]

In 1830 New York, Pennsylvania, and Vermont were the leading sheep-raising States. There were then about 12,000,000 sheep in the whole country. The number of sheep in Ohio, Indiana, and Illinois increased rapidly during the years 1820 to 1830. Ohio began to send wool to the eastern markets about 1825. The decade 1831 to 1840 was, on the whole, one of prosperity for the woolgrowers; during these years the finewool sheep, which had been neglected for some time, again became popular. Woolgrowing in South America and Australia had just begun to develop, and the supplies of wool from the Middle West were still small, so that the woolgrowers of the Eastern States found themselves in a good position to reap the benefit of the active demand. In 1840 the New England and the Middle Atlantic States had nearly 60 per cent of the country's sheep, which numbered 19,300,000.

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[4] Tariff Acts of the United States, 1789–1909, pp. 78, 79.

[5] Great Britain reduced the duty on raw wool in 1824 from 6d. per pound to 1d. per pound and in 1825 to 1d. per pound of 1s. value and 1s. 2d. per pound on wool under 1s. value. At the same time, colonial wool was made free of duty. It has been stated that this was done to offset the protection given to the American industry under the tariff of 1824. (See United States Treasury Department Report on Wool and Manufactures of Wool, 1868, pp. LVII and 225.)

[6] U. S. Treasury Department, Report on Wool and Manufactures of Wool, 1888, p. LVII.

[7] Four cents a pound plus 40 per cent the first year; 4 cents a pound plus 45 per cent the second year; 4 cents a pound plus 50 per cent after the second year. The duties on woolen goods were raised considerably. Tariff Acts of the United States, 1789–1909, p. 85.

[8] The rates of 1832 were: Wool valued at not over 8 cents per pound, free; wool valued at more than 8 cents per pound, 4 cents a pound plus 40 per cent. Tariff Acts of the United States, pp. 95, 96.

By an act of 1841 wool valued at 8 cents per pound or less was admitted free; when valued at more than 8 cents per pound, the duty was 20 per cent ad valorem.[9] By the tariff act of 1842, wool valued at 7 cents or less per pound, was dutiable at 5 per cent ad valorem; valued at more than 7 cents per pound, 3 cents a pound plus 30 per cent ad valorem.[10] In 1846 a 30 per cent ad valorem duty was levied on both wool and woolens.[11] In 1854 wool was admitted free from Canada under the reciprocity treaty,[12] and in 1857 it was practically put on the free list by the inclusion of a provision in the law that all wool costing less than 20 cents per pound at the place of exportation was to come in without duty.[13]

Domestic production increased from about 45,000,000 to 80,000,000 pounds between 1840 and 1860, while the imports increased from 10,000,000 pounds to 26,000,000 pounds per year. The increase in imports came principally from South America. By 1860 the Middle West was the leading section of the United States in wool growing. California was of considerable importance, and the growth of the industry in the West was accompanied by a decline in the Eastern States.

THE CIVIL WAR PERIOD.

In 1861 the Morrill Tariff Act introduced the principle of a compensating duty on woolen goods.[14] Most of the wool imported under this act and that of 1862 came in at a duty of 3 cents a pound. The compensating duty on woolen cloth was made 12 cents a pound. The act of 1864 retained this principle of a fourfold compensatory duty on cloth, and it crystallized in 1867 in the form which it kept for most of the time until 1913. The greater part of the wool imported under the act of 1864 was dutiable at 6 cents a pound, and the compensating duty on cloth was made 24 cents a pound.[15]

The tariff acts of 1861, 1862, and 1864 all divided wool into classes according to its value. The tariff of 1861 levied a duty of 5 per cent ad valorem on wool valued at not over 18 cents per pound; 3 cents a pound specific duty on wool valued at more than 18 cents but not over 24 cents a pound, and 9 cents a pound on wool valued at more than 24 cents a pound. Fifteen per cent ad valorem was levied on sheep skins with wool on.[16] The rates in the law of 1862 were the

[9] Tariff Acts of the United States, 1789–1909, pp. 117, 118.
[10] Ibid., p. 120.
[11] Ibid., pp. 143, 144.
[12] Ibid., p. 153.
[13] Ibid., p. 158.
[14] Taussig, F. W.: Tariff History of the United States, pp. 197, 198.
[15] Tariff Acts of the United States, 1789–1909, pp. 166, 167.
[16] Ibid., p. 205.

same as those in the act of the preceding year. The law of 1864 divided wool into four classes: namely, wool valued at not more than 12 cents per pound; valued at more than 12 cents but not more than 24 cents per pound; valued at more than 24 cents but less than 32 cents a pound; and valued at 32 cents or more a pound.

On these four classes the rates levied were, respectively, 3 cents a pound, 6 cents a pound, 10 cents a pound plus 10 per cent ad valorem, and lastly 12 cents a pound plus 10 per cent ad valorem. Twenty per cent ad valorem was levied on sheepskins with the wool on.[17]

It was found that contrary to the expectations of the framers of the law of 1864, large quantities of dirty and burry Buenos Aires wools could be bought for less than 12 cents a pound and imported at the 3-cent duty which it had been expected would apply only to carpet wools. This led to a request from the woolgrowers for a revision.

THE SYRACUSE CONVENTION OF 1865.

During the Civil War there had been an unusual demand for woolen goods, and prices were high for raw wool. With the cessation of military operations and the sale of large stocks of Army clothing, there was threatened a depression [18] in the wool industry affecting both the growers and manufacturers.

In order to alleviate the situation, a convention of woolgrowers and manufacturers met at Syracuse, N. Y., in December, 1865. This convention was important not only because the tariff act of 1867 with respect to wool and woolens grew out of recommendations first discussed in the convention, but because it was the beginning of a working agreement between the growers and manufacturers that has lasted in various forms down to the present time. The convention itself did not produce tangible recommendations for tariff legislation, but offered a series of resolutions which formed the text for the discussion of a great variety of questions relating to the wool trade.

The resolutions are too long to be reproduced in detail, but the substance of them is as follows:

1. The woolen industry is especially commended as one which develops both the agricultural and mechanical resources of the Nation.

2. The mutuality of the interests of the wool producers and wool manufacturers of the United States is established by the closest of commercial bonds—that of demand and supply.

3. Inasmuch as both branches of the industry involve much of the country's labor, they should be given equal protection against the accumulated capital and low wages of other countries.

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[17] Taussig, F. W.: Tariff History of the United States, p. 198.
[18] Ibid., p. 235.

4. The agricultural and manufacturing industries of all the States should be developed in order that home markets may be furnished for the products of both interests.

5. The Executive Committees of the National Wool Growers' Association and National Wool Manufacturers' Association should lay before appropriate committees of Congress the necessary facts and figures to put into operation the suggestions made in the resolutions.

In pursuance of the last resolution the Executive Committees of the two associations met in New York in February, 1866, and after reviewing in detail the subjects discussed at the convention, made the following recommendations to the Revenue Commission:

First, a duty of 10 cents per pound and 10 per cent ad valorem on the fine wools of Australia, South America, and other countries, with no change in duty on the other wools—medium and coarse grades.

Second, and more important from the standpoint of the history of tariff legislation, all imports of woolen or worsted goods should pay, in addition to a duty of 25 per cent ad valorem, an amount equivalent to the duties on the wool, dyestuffs, and other raw materials involved in the manufacture of the imported goods; in short, a compensatory duty.

Later in the year the Committees of the two associations made separate reports to the Revenue Commission, giving in more detail their recommendations, which were largely adopted in the tariff act of 1867.

More important, perhaps, than the resolution of the Committee are the tariff recommendations which grew out of them and the community of interest, or at least armed agreement, between the wool-growers and wool manufacturers—an agreement which was influential in shaping the tariff policy on the wool schedule for half a century afterwards.

THE TARIFF ACT OF 1867.

One of the important features of the act of 1867 was the "blood classification," which was introduced upon the recommendation of the National Wool Growers' Association.[19] Means of more exact identification for the different classes of wool were provided by

[19] Report of the Executive Committee of the National Wool Growers' Association relative to duties on wool, made to the United States Revenue Commissioner, April, 1866. S. Doc. No. 458 (1910), p. 100.

naming the localities from which they usually came.[20] The classification, though usually referred to as being according to the blood of the sheep on which the wool was grown, was in reality a threefold classification: (1) That describing the use of the wool in the title of each class, viz, Class I, clothing wool; Class II, combing wool; Class III, carpet wool; (2) that defining the "blood" or breed of the sheep; (3) that naming the localities where the wool was produced. Mr. George William Bond, of Boston, selected the samples which were used to identify the class of imported wool at the customshouses.[21] The manner in which this classification became obsolete through the improvements in combing machinery and changes in the uses of wool has been noted in the preceding chapter.

It is to be noted that the change in classification which was made in 1867 considerably increased the duty. There were four value

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[20] The classification in the act of 1867 was as follows:

Class I—*Clothing wools.*—"That is to say, Merino, Mestiza, Metz or Metis wools, or other wools of Merino blood, immediate or remote; Down clothing wool, and wools of like character with any of the preceding, including such as have been heretofore usually imported into the United States from Buenos Aires, New Zealand, Australia, Cape of Good Hope, Russia, Great Britain, Canada, and elsewhere, and also all wools not hereinafter described or designated in Classes II and III." This class, then, includes Merino wool, pure and mixed, and Down clothing wools.

Class II—*Combing wools.*—"That is to say, Leicester, Cotswold, Lincolnshire, Down combing wools, Canada long wools (words "Canada long wools," accidentally omitted, were added Mar. 22, 1867), or other like combing wools of English blood, and usually known by terms herein used; and also all hair of the alpaca, goat, and other like animals."

Class III—*Carpet wools.*—"Such as Donskoi, native South American, Cordova, Valparaiso, native Smyrna, and including all such wools of like character as have been heretofore usually imported into the United States from Turkey, Greece, Egypt, Syria, and elsewhere." This class is much more loosely designated than the other two and includes all wools that are not embraced in the other two classes.

The duties were as follows:

Classes I and II: Value 32 cents or less, a duty of 10 cents per pound and 11 per cent ad valorem; value more than 32 cents, a duty of 12 per cent per pound and 10 per cent ad valorem.

Class III: Value 12 cents or less, duty 3 cents a pound; value over 12 cents, duty 6 cents a pound.

Class I wools were to pay double duty if washed and treble duty if scoured. Class II and Class III wools were to pay treble duty if scoured.

Any wool which had been altered, by sorting or otherwise, from its original condition, was obliged to pay double duty. (Tariff Acts of the United States, 1789–1909, pp. 258–261.)

[21] The preparation of the samples (of 1867) "being completed in May, 1868, the Secretary of the Treasury appointed a commission for their examination. The commission, consisting of Mr. Edwards, Chief of the Customs Division; Mr. Baush and Mr. Rice, respectively appraisers of New York and Boston; Dr. Randall, Mr. Hammond, of Vermont, Dr. Townsend, of Ohio, and Mr. Loomis, of Connecticut, representing the National Wool Growers' Association, and Mr. Edmands, Mr. Hayes, and Mr. Cameron, representing the National Association of Wool Manufacturers, assembled in Boston and carefully examined the standard samples, which received the unqualified approval of the examiners, both as to the principles of classification and conformity of the samples to the intent of the law.

"In 1872 Mr. Bond wrote a second paper on Wool Classification equally valuable and important to accompany a new set of samples he had prepared at the request of the Secretary of the Treasury. These samples were destroyed in the great fire of 1872. He had visited Europe in the collection of these samples and made the acquaintance of many of the men famous abroad for their knowledge of fiber." (Bulletin of Nat'l. Ass'n. Wool Mfrs., XLVII, p. 176.)

classes under the act of 1864. The rate on all wool of Classes I and II, under 32 cents a pound value, was made practically the same as that applying to the 24 to 32-cent class under the 1864 law.

The duty, as it was fixed in 1867, and kept in force for most of the time since then, was more than 50 per cent of the value of the wool abroad.[22] A compensating duty of 50 cents a pound was levied on woolen cloth, on the assumption that it took 4 pounds of wool to make 1 pound of finished cloth, and that the manufacturer should be further compensated for the duties paid on oils, dyestuffs, etc., and for interest on the money advanced in payment of duties. An additional duty of 35 per cent ad valorem was laid on the woolen goods, 10 per cent of which was compensation for the internal-revenue tax, and the remaining 25 per cent of which was considered as the protective part of the duty. On some of the cheaper goods the specific duty was less, because the amount of wool used was less. In the case of carpets, the specific duty was levied by the square yard instead of by the pound, but the same principle of compensation was supposed to underlie that duty also. Inasmuch as less than 4 pounds of wool are usually needed to make 1 pound of cloth, the "compensatory" part of the wool duties afforded additional protection for the manufacturers.

The advocates of the "four to one" ratio do not seem to have attempted to establish the fact that, on the average, 4 pounds of raw wool are required to make a pound of cloth. They asserted that 4 pounds of Mestiza wool only (which was not carpet wool, but was being imported as such at a duty of 3 cents per pound, from 1864 to 1867) are required for that purpose. They considered, however, that the maximum figure should be used rather than the minimum or the average. The records of only one mill were examined in the course of the investigation to establish this ratio, although it was stated that "the concurrent testimony of experienced manufacturers" was in agreement with the results shown in that one establishment.[23]

Only 2⅛ pounds of washed American wool are required to make a pound of finished cloth, according to the report of the woolgrowers to the Revenue Commission.[24]

The double duty on washed wool was not levied on combing wools because most of the wools of that class came from Canada where

[22] Taussig, F. W.: Tariff History of the United States, p. 202.

[23] The Proctorsville Woolen Mill, Proctorsville, Vt. (S. Doc. No. 458, 1910, p. 116.)

[24] The same amount was formerly made by 2 pounds of washed American wool, but washing is now less perfectly performed and a small amount of our wool is brought unwashed into the market, so that taking the average of the whole 2⅛ pounds are required for a pound of cloth. (S. Doc. No. 458, 1910, p. 106.)

washing was the custom, as it was also in England. This concession favored the young and growing worsted industry.[25]

In 1872 a horizontal reduction of 10 per cent in the rates was made.[26] The rates of 1867 were, however, restored in 1875.[27]

The years from the close of the Civil War to 1880 marked a great expansion of the sheep industry on the ranges of the far West.[28] The number of sheep in the whole country increased from 28,000,000 in 1870 to 42,000,000 in 1880, most of the increase being in the Rocky Mountain and Pacific States (3,952,000 to 14,282,000).

THE TARIFF ACT OF 1883.

In 1883 the duties on raw wool were lowered slightly and the compensating duty on woolen goods was reduced from 50 to 35 cents a pound. The reduction in the wool duties came through the removal of the ad valorem element in the duty—11 per cent ad valorem on wools costing less than 32 cents a pound and 10 per cent ad valorem on wools costing more than 32 cents a pound. (Classes I and II.) The dividing line between the value-classes was fixed at 30 cents a pound, which did something to offset the reduction.[29] This left the duty on the cheaper grades of wool, such as were raised in Texas and the Territories, at a point where it was still prohibitive, while on the better grades the reduction was unimportant.[30] The duties on carpet wools had been 6 cents a pound on wool costing over 12 cents a pound and 3 cents a pound on wool costing not over 12 cents a pound. These rates were reduced to 5 cents and 2½ cents, respectively, a small but nevertheless a real reduction.[31]

The compensating duty was rearranged in this year on the assumption that only 3½ pounds of wool are used in making a pound of cloth.

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[25] A protest against the duty on combing wools was made by the worsted manufacturers. "We estimate the capital now employed in the manufacture of the various kinds of worsted goods at $8,000,000 and the yearly value of the product at not less than $10,000,000. We do not hesitate to say that, in our opinion, the whole of this manufacture is dependent upon the supply of Canada wool and that if Canada wool should be subjected to duties ruling under the present tariff, the greater part of this manufacture would be suspended." (S. Doc. No. 458, 1910, p. 137.)

[26] The rate of duty on Class I and Class II wools was reduced to 9 cents a pound plus 9.9 per cent on all wool valued at 32 cents or less; to 10.8 cents a pound on all wool valued at more than 32 cents a pound. The rate on Class III wools was made 2.7 cents a pound on wool valued at 12 cents or less and 5.4 cents a pound on wool valued at more than 12 cents a pound. The relation between duties on greasy, washed, and scoured wools remained the same as in the act of 1867. (Tariff Acts of United States, 1789–1909, p. 289.)

[27] Tariff Acts of United States, 1789–1909, p. 306.

[28] See Chapter 8 *infra*.

[29] Under the act of 1883 the rates were: On class I and Class II wools valued at 30 cents a pound or less, duty 10 cents a pound; valued at more than 30 cents a pound, duty 12 cents a pound; on Class III wools valued at 12 cents a pound or less, duty 2½ cents a pound; valued at more than 12 cents a pound, duty 5 cents a pound. The double and treble duties on washed and scoured wool remained as in the act of 1867. (Tariff Acts of the United States, 1789–1909, pp. 336–337.)

[30] Taussig, F. W.: Tariff History of the United States, p. 239.

[31] Ibid., p. 206.

The ad valorem duty on the finer woolens (those costing more than 80 cents a pound) was increased from 35 per cent to 40 per cent, while on the cheaper grades (those less than 80 cents a pound) the duty remained at 35 per cent. The duties on dress goods were increased.

Opinions as to the effect of the changes in duty upon the wool-growing industry differed greatly.[32] A Tariff Commission held hearings in many sections of the country in 1882. Advocates of all the various shades of opinion on the tariff testified at these sessions. The National Woolgrowers' Association and the Executive Committee of the National Association of Wool Manufacturers held meetings in Rochester, N. Y., on August 30 and 31, 1882, and appointed a joint committee of the two associations, which came together on October 5, 1882, when the following resolution was unanimously adopted:

> Whereas, at a joint conference of the committees of the woolgrowers and wool manufacturers held this day, the woolgrowers deemed it inexpedient at this time to concede any reduction in the rate of duty upon wools: Therefore
>
> *Resolved*, That we report the same to our respective organizations for future instructions.

A representative of the National Association of Wool Manufacturers[33] appeared before the Tariff Commission and presented resolutions which advocated a slight change in the duties on wool and woolens. The manufacturers agreed upon the basic soundness of the plan, with its compensating duties, which had been enacted into law in 1867. They submitted a plan, however, favoring reduction of the duty on wool of the first class, if imported unwashed, to 10 cents a pound; if imported washed, 15 cents a pound; a duty upon wool of the second class of 10 cents a pound; and on wool of the third class, if imported unwashed, 2 cents a pound, and if imported washed, 3 cents a pound.

It will be noted that this not only reduced the amount of duty but did away with the differentiation between wools of different value in the first and third classes. It also reduced the proportional

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[32] One view was that "the numbers of sheep declined annually under the operation of the tariff reduction of 1883 from 50,626,626 as estimated in 1884 to 42,599,079 in 1889. The lowest prices were reached in 1886. In 1887 there was a slight increase in price and the decline in numbers would have been arrested but for the continued threat of free admission of the wools of the world." (Report of the Department of Agriculture for 1890.) The other opinion was that "the downward tendency in the prices of all the great staple productions of the world, occurring simultaneously, and due in every instance to causes plainly traceable and equally applicable all the world over, proves that the act of 1883, so far as its modification of the duties on wool was concerned, had nothing to do with the fall in the price of wool." (Bulletin of the Nat'l. Ass'n. of Wool Mfrs., Vol. XX, p. 152.)

[33] Mr. William Whitman, of Boston.

amount of duty on washed wool, making it only 50 per cent more than that on unwashed wool for both the first and third classes. They favored the triple duty on scoured wool, however, which had obtained under the law of 1867. It was stated as the opinion of the Manufacturers' Association that the duty on carpet wools should be entirely done away with, but the reductions were submitted as desirable in case the Commission should not be willing to recommend the entire removal of duty.

It was expected that the reduction proposed would have no effect on the price of wool, because the greater part of the wool grown in this country was cheaper than it (the then prevailing foreign price plus the suggested rates of duty) would have been had the wool been admitted at that rate of duty.[34] The ratio of 4 pounds of raw wool to 1 pound of finished cloth was admitted to be somewhat too high.[35] It was stated that the tariff of 1867 excluded especially the wools from South America and that those wools were sent to Belgium. In reply to a question by one of the Commissioners as to whether the recommendation of lower rates on wool was based on the fact that the woolen manufacturers felt that they were getting on their feet and preferred free wool and the world for a market the representative of the Wool Manufacturers' Association answered:

> I do not think it has got to that point yet. There are manufacturers who belong to our association who talk free wool, but I have been surprised to see that whenever the tariff question came up they seemed to be just as anxious for high rates as other people, and I find that what they mean is free wool and a high duty on imported goods.

A representative of the Wool Growers' Association[36] appeared before the Commission and opposed the reduction of the duties favored by the Wool Manufacturers' Association. He emphasized the fact that stable conditions were necessary to the prosperity of the sheep industry and said that much capital had been invested in it in anticipation of a continuation of the duties. He asserted that the average price of medium wool in Boston for 35 years preceding the Civil War was about 43 cents, while the average price of the same wools during the 15 years preceding 1882 had not been more than 43 cents and except in 1871-72 had been less.[37] He asserted that the consumer had been enabled, through the direct influence of the wool tariff, to secure a supply of cheap mutton; that there had been a 61 per cent increase in the domestic wool output from 1870 to 1880;[38] that the industry was undergoing a transition,

[34] Report of the Tariff Commission, 1882, Vol. II, p. 2422.
[35] Ibid., p. 2424.
[36] Mr. William G. Markham, of Avon, N. Y.
[37] Report of the Tariff Commission, 1882, Vol. II, p. 2522.
[38] 1870, 163,000,000 pounds; 1880, 264,000,000 pounds.

during which it was dangerous to change the tariff policy.[39] He maintained that the duty should be specific, because of the administrative difficulties with the ad valorem duty, and answered the objections to the complexity of the duties by saying that the united testimony of the appraisers of Boston and New York was to the effect that no difficulty was experienced from that cause.[40] He said that the criticism that the duty discriminated against the heavier class of fine wools was in reality a criticism of the foreign producer, because the remedy was to be found by the foreigner, who might bring his product to the condition of the article he sought to supplant.[41] He said, in reply to a question by one of the Commissioners, that carpet wools did not compete with domestic wools, except as they were used to adulterate fabrics.[42]

Before the Commission the opponents of the wool duties quoted one of the leading representatives of that group[43] in an argument which ran as follows: That the American wool grower has received on the average, during the years since 1867, a lower price than he did under the low tariff of 1857, when wools costing less than 20 cents per pound were admitted free of duty and all wools costing above that paid but 24 per cent ad valorem; that the number of sheep owned and quantity of wool produced east of the Rocky Mountains has constantly diminished; that wool manufacturing has paid a smaller percentage on the capital invested than any other leading branch of domestic industry, while the consumers have paid more for woolen clothing than people of other countries; that the duties have not made the United States independent of foreign wool or woolens.

TARIFF DISCUSSIONS 1884–1890.

A proposal in 1884 to reduce the duties levied in 1883 by 20 per cent was defeated,[44] as was an act introduced into Congress in 1886 which placed wool on the free list.[45] During the eighteen hundred and eighties there was a great deal of discussion of the tariff ques-

[39] The tenure of the lands on which sheep are now most cheaply subsisted is already affected and will, within a few years, be materially changed. The construction of railroads and influx of immigration will inevitably increase the cost of flock maintenance, while the cost of fitting unimproved regions for comfortable living must be simultaneously borne. Until these rapid changes in values become slower and less violent—until the actual results of the large ventures in wool production in the newer localities, with their inseparable risks, have been determined—it will, in our judgment, prove detrimental to this industry to reduce the amount of protection now afforded. (Report of the Tariff Commission, 1882, Vol. II, p. 2523.)

[40] Ibid., p. 2521.

[41] Ibid., p. 2523.

[42] Ibid., p. 2528.

[43] Statement of David A. Wells in Report of the Tariff Commission, Vol. I, p. 1151.

[44] The Morrison bill.

[45] Taussig, F. W.: Op. cit., p. 252.

tion.[46] Much of the criticism of the wool duty during this time took the form of advocacy of the benefits of free raw materials, which was the tenor of President Cleveland's message of December, 1887. The Mills Bill of 1887–88 placed wool on the free list and eliminated the compensating duties on woolen goods, while the Senate Bill, prepared during the same session, provided for a small increase in the duty on clothing and carpet wools, a corresponding increase in the specific duties on woolen goods, and an increase of the ad valorem rates on some classes of woolen goods. Neither of these bills became law and the next revision of the tariff was by what is known as the McKinley Tariff Act of 1890.

After the election of 1888 and before the McKinley Act was made law, extensive hearings were held by the Ways and Means Committee. A petition favoring free wool, signed by wool manufacturers, was presented to the committee, and another favoring a single ad valorem duty on all classes of wool, also signed by manufacturers, was presented.[47] It was later stated to the committee by other representatives of the manufacturers that these petitions represented the views of a small minority.[48]

The National Association of Woolgrowers later presented resolutions to the Ways and Means Committee stating that—

> Whereas petitions to Congress are being circulated and signed by some, but only a small portion, of the "leading manufacturers and merchants"—the latter presumably importers—in the New England States, asking that the duties on raw wool may be removed or greatly reduced, while others ask for a single ad valorem duty on all classes of wool, the effect of which, if adopted, would be to increase imports and diminish home production,

the woolgrowers believe that their industry will be destroyed if free wool is adopted, and if it becomes the policy of the manufacturers to demand free wool, the growers will be "driven to demand that the duties on all woolen and worsted goods, including carpets, shall also be removed.[49] The growers also asked for legislation to prevent the importation of clothing and combing wools as "carpet" wools and

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[46] It is maintained that the amount of the protection which the manufacturer receives is the limit of the actual protection which the wool grower receives, for the reason that the manufacturer must buy wool low enough to enable him to compete with foreign goods. If the duty were taken off of goods and kept upon wool, American wool would decline until the American manufacturer could buy it at a price at which he could compete with foreign goods made by operatives who received less than half the wages paid to the same class of operatives in America * * *. This recommendation, coming as it does from an administration which favors free trade in many articles, shows the unfairness of the working of the worsted clause in the tariff law of 1883, and if growers can secure nothing else at this time, this correction, suggested by the Secretary of the Treasury, would be an enormous gain to the producer of wool. (From statement of Judge William Lawrence, of Ohio, Hearings before the Committee on Ways and Means of 51st Cong., 1st sess., p. 272.)

[47] Tariff Hearings of 1888–89, pp. 176 and 180.

[48] Ibid., p. 287. Statement of William Whitman, president of National Association of Wool Manufacturers.

[49] Tariff hearings of 1888–89, p. 252.

to prevent undervaluation and other frauds. It was asserted that a great deal of scoured wool was being imported as washed wool from southern Russia, and it was also stated that when the price of domestic wool was low it was used in carpets and that so-called carpet wool was used in cheviots[50] and other clothing fabrics.[51] They affirmed that the bill passed by the Senate January 22, 1889, was in most respects satisfactory to them.[52]

The National Association of Wool Manufacturers presented resolutions which favored the continuance of the duty on wool. They said:

> It is not denied that there exists a counter sentiment among manufacturers which favors free wool, instead of the compensating duties on manufactures of wool necessary to overcome the disadvantages of the wool duties—

but that such a view was not held by many.

> They will be found to include but a small percentage of the actual wool-manufacturing capacity of the United States, certainly not to exceed 10 per cent.[53]

At the same time they stated that they were opposed to placing the duty on wool at a point which would make it impossible to import any. Their preference was for the maintenance of the duty in force rather than for an increase.[54] The Association took a stand against the increase of duty, amounting to 60 per cent, upon carpet wools, which had been proposed by the Senate Bill.[55]

THE TARIFF ACT OF 1890.

The duty on Class I wool was increased in 1890 from 10 cents a pound to 11 cents a pound; on Class II wool from 10 cents a pound to 12 cents a pound; on Class III wool, valued at more than 13 cents per pound, it was placed at 50 per cent ad valorem, and valued at 13 cents or less per pound, 32 per cent ad valorem. The actual effect of the changes on Class III was a slight increase in duty. The names "Clothing," "Combing," and "Carpet" wools were dropped in framing the act of 1890, as the uses of the different kinds of wool had changed. The provision for triple duty on scoured wool of Class III was dropped, the ad valorem duty being considered as adequate to make the differentiation between wools of dissimilar value.[56]

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[50] Tariff hearings of 1888–89, p. 265.

[51] Ibid., p. 230

[52] Ibid., p. 252.

[53] Ibid., p. 287.

[54] The wholesale market value of our annual importations of manufactured wool exceeds by nearly 50 per cent the value of our annual clip. This emphatic evidence of the failure of the present duties to protect the woolgrower is due to the failure to correspondingly protect the manufacturer, by whose prosperity alone can a prosperous sheep husbandry be maintained. (Hearings of 1888–89, p. 299.)

[55] Ibid., p. 299.

[56] Tariff Acts of the United States, 1789–1909, pp. 398, 399.

More stringent administrative provisions were inserted in the law. If carpet wool were improved by mixing with it any Merino or English wool, it was to be dutiable as one of those kinds. If a bale of wool contained wool of two classes, it was to be dutiable at the higher rate, and if any wool had been improved by the rejection of any part of the original fleece, it was to be subject to double duty.[57] This latter rule did not apply to skirted wool nor did it include sorted scoured wool.

The compensatory duties were arranged on a somewhat different basis in 1890. If the imported woolen cloth was worth 30 cents or less a pound, the compensatory duty was 33 cents a pound, on the assumption that 3 pounds of raw wool went into a pound of the cloth; if the cloth was worth between 30 and 40 cents a pound, the compensatory duty was 38½ cents (3½ times the duty on raw wool of Class I), and if it was worth more than 40 cents a pound, the old "4 to 1" ratio was assumed and the compensation was fixed at 44 cents a pound. The protective element in the duties on manufactures of wool was raised, as well as the compensatory part of the duties.[58]

THE TARIFF ACT OF 1894.

Wool was put on the free list in 1894 and duties on woolen goods were made ad valorem, varying from 25 to 50 per cent.[59] The admission of wool free of duty began in August upon the enactment of the law, while the reduced duties on woolen goods did not go into effect until January 1, 1895.

There were large importations of wool and woolen goods during the period from 1894 to 1897 and a falling off in the domestic production. The decline in woolgrowing was differently interpreted by the opposing schools of thought. One group of persons said that the world's supply of wool had been increasing somewhat faster than the demand during the years immediately preceding this time, on account of the growth of the industry in Australasia and South America, and that prices, which had been low before, took a further down-

[57] Schedule K, par. 383. Act of Oct. 1, 1890.

[58] The explanation given of the need for these changes is as follows: "The National Association also asks that in each instance where the specific duty was made too low in the revision of 1883 to equalize the duty then fixed on wool, it shall be increased to an amount sufficient to become compensating. The law was thrown out of harmony with the principle underlying it. The association seeks to restore that harmony and in so doing it is not seeking any increase in the tariff for the sake of more protection. It seeks only to make the compensating duties exact. Right in this connection let me remind you that not only are existing duties lower than under the law of 1867 but so great has been the decrease in the value of foreign manufactures of wool that the ad valorem rate of 35 per cent, which was adopted in 1867, is equivalent to a rate of 55 per cent in 1889, irrespective of the fact that the gold premium existing in the former year served as an added protection to American goods." (Bulletin of Nat'l. Ass'n. of Wool Mfrs., Vol. XX, p. 16.)

[59] Tariff Acts of the United States, 1789–1909, pp. 487–488, 504.

ward trend in 1891; then the business depression in 1893 and the placing of wool on the free list in 1894 furnished the last straws which broke the faith of the American farmers in woolgrowing.[60]

Persons holding the opposing view said, however, that the act was responsible for the severe depression in the industry which followed its enactment.

The wool tariff of 1867, so the argument runs, had been ample for conditions then existing, and under it the prices of wool were fairly remunerative. Sheep increased from 28,500,000 in 1870 to 50,600,000 in 1884. Then the duty on wool was reduced in 1883, and the number of sheep declined from 50,600,000 in 1884 to 43,400,000 in 1891. The act of 1890 was protective in character, but it introduced the so-called "skirting clause" and ad valorem duties on third-class wools. Under it wool prices went down and sheep declined in numbers and value. Then the act of 1894 gave a destructive blow to the industry.[61]

THE TARIFF ACT OF 1897.

The tariff was again revised in 1897. The National Wool Growers' Association asked Congress to enact a bill having the following provisions: Wool was to be divided into only two classes, Class I and Class II, under the old law, being combined in a new Class I. All China wools (which were sometimes used as substitutes for Class I wools, though put in Class III) and similar wools, and all camel's hair, alpaca, and other animal hairs were to be included in that class; "carpet wools" were to be put in Class II. The duty upon all wools and hair of the first class was to be 12 cents per pound and upon the second class 8 cents per pound. The association further proposed that wool washed or cleansed in any other manner than on the sheep's back should be considered as scoured wool.

A double duty was to be levied on all the washed wool and a treble duty on all the scoured wool. Penalties similar to those in the act of 1890 were to be enforced if the carpet wools should be improved by the admixture of Merino or English wool. The provisions of the

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[60] Wright, C. W.: Woolgrowing and the Tariff, p. 314.

[61] "*Ruinous effects of the act of 1894.*—Then came the last, most fearful, and destructive blow ever aimed at the wool industry—the free-wool Wilson act of Aug. 27, 1894.

"The able secretary of the National Wool Manufacturers' Association has said that the number of sheep in 1893—47,223,000—* * * has been decreasing at the rate of 3,000,000 annually under free wool, and their number had receded on Apr. 1, 1896, to 36,464,405, with an average value of $1.70 a head. The loss in number is more than 10,000,000 in three years and in value over $60,000,000. * * * The clip of the present year, according to the annual estimates of the National Association, will not exceed 270,000,000 pounds, and the average farm value will not exceed 8 cents a pound, reducing the total value to $20,800,000—a loss of 60 per cent.

"The average decline in the whole group (of wool prices) is 42 per cent.

"No other commodity, raw or manufactured, has suffered a decline in value which approximates this." (Tariff Hearings, Committee on Ways and Means, 1896–97, Vol. II, p. 1354.)

proposed law would result in all Australian wools being regarded as washed wools, and subject to double duty. They also desired the rates of duty on unwashed wools of Classes I and II to increase at the rate of one-half cent a year until they reached 15 cents a pound.

The Wool Manufacturers' Association opposed the enactment of these rates of duty on wool, asserting that they would fatally hamper the American wool manufacturers and excite opposition on the part of the general public, which would be followed by agitation liable to bring about another tariff revision.[62]

Representatives of the growers and of the manufacturers met and discussed the proposed wool duties. The manufacturers suggested a schedule of rates which were the highest that they could support before the Ways and Means Committee.[63] The growers did not agree to the proposed rates and so would not join the manufacturers in advocating any scale of rates on the raw material. The representatives of the manufacturers stated before the Ways and Means Committee that before the experience under free wool the manufacturers had not realized the full extent of the disadvantage they suffered by reason of the wool duty.[64] These disadvantages were:

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[62] Bulletin of Nat'l. Ass'n. Wool Mfrs., Vol. XXVII, p. 45.

[63] "Class I wools, costing 16 cents or less, 8 cents a pound; costing over 16 cents, 10 cents a pound; twice these duties on washed wools and three time on scoured.

"Class II wools: Nine and 11 cents a pound, with the same dividing line of value; washed wools at the single rate; scoured, triple duty.

"Class III wools: The McKinley law duties—32 per cent under 13 cents a pound in value; 50 per cent over that value, without the sorting clause." Ibid., Vol. XXVII, p. 100.

[64] Senator Lee Mantle said: "In answer to this I might say that never until he had experienced the disadvantages which he suffered under free wool did the wool grower realize the impossibility of offsetting this disadvantage by the compensatory benefit derived from being able to buy his clothing a few cents cheaper." (Speech of June 4, 1897, in the United States Senate.)

There have been two opposing views of the effect of a duty on this raw material. The first is that the value of the wool is so small a part of the value of a suit of clothes (or of a blanket or other wool fabric) that a duty makes very little difference to the consumer. The other opinion is that the duty, while it may be small in the case of any particular purchase, is fairly large in the aggregate for each consumer and makes a large total for the whole country.

Expanding both of these arguments somewhat, in the first case it is alleged that 9 pounds of three-eighths-blood wool raised in Idaho will make a man's three-piece suit of average weight. Wool of this kind shrinks perhaps 54 per cent in scouring. Nine pounds of raw wool would therefore yield 4.14 pounds of clean wool. From clean wool to cloth there is a shrinkage of about 20 per cent in weight. Therefore 4.14 pounds of clean wool will make 3.32 pounds of cloth (about 53 ounces). This would be more than enough to make 3½ yards of cloth, 14 ounces to the yard. The grower would get for his 9 pounds of wool at 53 cents a pound $4.77, or probably, about 10 per cent of the price of the finished suit. (See National Wool Grower, August, 1919, p. 31.) The opponent of the duty would say, on the other hand, that with a duty giving an effective protection of 8 cents a pound (the amount by which the price of wool is considered to have been raised by the duty before 1913), and an importation of 150,000,000 pounds a year of Class I wool, the consumer would have to pay $12,000,000 more for the imported wool. Under the same assumption the domestic clip of 300,000,000 pounds would be increased in price by $24,000,000, so that domestic consumers would have to pay $36,000,000 more a year for their wool. The opponents of a duty would also add that the duty is cumulative; that more capital is required to carry the stocks of wool at higher prices, and that a percentage of the higher price is collected by each person who has a part in the manufacture and selling of the goods.

(1) The duty restricts the manufacturers within narrow limits in the selection of foreign wools, confining him to the light-shrinking wools; (2) the concentration of the American purchasers upon the foregoing kinds of wool increases their price and adds to the cost of wool, some in excess of the actual duty paid; (3) the foreign manufacturer has the range of his choice enlarged, and the price of his wool reduced; (4) the restrictions and limitations of the old law impede the manufacturer in his choice of wools and are an additional disadvantage for which he gets no compensation.[65] The manufacturers did not oppose a duty upon wool, but rather the high scale of duties which were asked by the growers.

Some of the manufacturers of carded woolens asserted that they were at a disadvantage, under the law of 1890, as compared with the worsted manufacturers. This was due, so they said, to the discrimination which they charged existed against the heavier shrinking wools, and to the fact that the combing wools, used by the worsted industry, were admitted at the same rate whether washed or unwashed.[66] They desired the merging of Class I and Class II wools. They also protested against the high rate of duty on noils, which are a by-product of the worsted industry, but are used in the manufacture of woolens. The worsted manufacturers replied that they had as much interest in the duties on "clothing" wools as in those on "combing" wools, since the changes in combing machinery enabled them to use the shorter wools, and the growth of their industry had brought it about that they used more than twice as much imported wool as did the woolen manufacturers. They added that fashion had favored the worsteds over the woolens, but that was a condition with which the tariff had nothing to do.

The woolgrowers opposed the use of ad valorem duties on raw wool. The reasons they advanced for their opposition to this proposed practice were: First, that when foreign wools declined in price and thereby produced a greater need for protective duties, less protection was given; and that when foreign wools advanced in price and the need of protection grew less, greater protection was given. Second, that ad valorem duties were an inducement to the organization of combinations to depress the dutiable prices; for example, they said, Donskoi wools from Russia had been manipulated by a combination of importers and by loans of money to flock owners for the reduction in the price of wool. Third, ad valorem duties invited fraud in invoices.[67]

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[65] Statement of Mr. S. N. D. North in Bulletin Nat'l. Ass'n. Wool Mfrs., Vol. XXVII. p. 85.

[66] "The advantage of the worsted manufacturer in obtaining his wools at relatively lower rates of duty enables him to manufacture his goods and place the same upon the market at a price that precludes the successful competition of the woolen manufacturer." (Tariff Hearings, 1896–97, Vol. II, p. 1609.)

[67] Tariff Hearings, 1896–97, Vol. II, p. 1409.

The old controversy in regard to "carpet wools" was renewed, and much evidence was introduced on both sides to prove that the imported carpet wools did or did not compete with certain grades of the domestic wool. Considerable evidence was also brought to show that these wools were used, or could be used, in various kinds of fabrics suitable for making clothing, and many statements were also adduced to controvert this assertion. It was stated that "around Class III wools centered the greater part of the intense feeling which embarrassed the framing of the wool schedule."[68] A proposal was made for a compromise between the woolgrowers and the carpet manufacturers under which the Government would inspect the manufacture of carpets in bonded warehouses. The woolgrowers were willing to accept this, but it did not prove practicable because carpet-yarn spinners were important factors in the industry, and the persons employed in that branch of the business could not guarantee that the yarns they sold would go into carpets.[69] The growers succeeded in getting some kinds of Class III wool transferred to Class I, namely, the Bagdad, Castel Branco, Adrianople skin wool, Egyptian, and China lambs' wool.

One of the principal objections of the growers to the law of 1890 had been in regard to the skirting clause. They maintained that under that law wools were frequently imported as skirted wools which were in reality sorted and that thereby domestic woolgrowers lost a large part of the protection nominally given by the tariff.

Facts and figures were adduced by the manufacturers to show that the process of skirting did not enhance the value of the fleece nearly as much as the growers maintained. The spokesman of the growers replied, however, that "skirted wools, as imported under free wool, with no incentive to reduce the shrinkage for the purpose of evading the duty, and skirted wools as imported under a protective tariff, are two entirely different propositions."[70]

There was a very spirited argument over the amount of duty necessary on the different classes of wool. On the one hand, it was maintained that the rates of the law, as it was passed, effected the highest protection which wool had ever received when figured on an ad valorem basis. This was due to the general fall of the prices of wool in the world markets.[71] The average value per bale (approximately 330 pounds) of the Colonial wool (Australian and Cape) in 1867 was £20¾ sterling; in 1883, £16¾; in 1890, £14¾, and in 1896, £12; as shown by the wool circulars of Helmuth, Schwartze & Co., of London. This was denied by the woolgrowers, and they added

[68] Bulletin of Nat'l. Ass'n. Wool Mfrs., Vol. XXVII, p. 239.
[69] Ibid., p. 240.
[70] Speech of Hon. Lee Mantle, of Montana, in the United States Senate, June 3, 1897.
[71] Bulletin of Nat'l. Ass'n. Wool Mfrs., Vol. XXVII, p. 237.

that even if it were true, the principal fact of importance was that because of the low price of wool and the discouraging prospects they were in need of greater protection than before.[72]

A plea was made by the growers for double duty on washed wools of the first two classes. They stated that a concession was made in the first instance, in order to encourage the worsted industry which had grown to the point where it did not need this "bonus at the expense of the wool growers."[73] They asserted that nearly 50 per cent of the sheep in the United States were producing crossbred wool with which the imported washed wools of Class II came into direct competition. The reply of the manufacturers was that there were no washed Class II wools in existence, within the tariff definition, except those of Great Britain and Canada. Those from Canada always reached the market washed, and double duty would be prohibitive to imports. Wool of this class was used in conjunction with domestic wools, and the prohibition of importation would consequently curtail the use of domestic wools rather than enlarge it.[74] There was also considerable discussion of the compensatory duties on woolen goods, the growers maintaining that these duties contained more than adequate compensation, while the manufacturers denied it.

The law, as it was finally passed, contained the following rates: On Class I wool, 11 cents per pound, unwashed; 22 cents a pound, washed; and 33 cents a pound, scoured; on Class II, 12 cents a pound, unwashed or washed, and 36 cents a pound, scoured; on Class III, valued at 12 cents per pound or less, 4 cents a pound, and if valued over 12 cents per pound, 7 cents a pound. If wool of this class were imported in condition for use in carding or spinning into yarns, or containing not over 8 per cent of dirt, the duty was trebled. Wool on the skin was admitted at a rate of duty, 1 cent a pound less than wool of the same class not on the skin. The "skirting clause" of the act of 1890 was retained in the act of 1897, and the compensatory duties of that act were restored.[75]

THE TARIFF ACT OF 1909.

The next revision of the tariff came in 1909. That date found the sheep-raising industry in just about the same position that it had been in 1890, as regards the number of sheep and the size of the annual clip. There were 43,000,000 sheep in the country in 1891 and 42,000,000 in 1909, while the clips of the two years were 307,000,000 pounds and 311,000,000 pounds, respectively. The location of sheep raising in this country, however, had changed considerably.

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[72] Speech of Senator Mantle. Bulletin of Nat'l. Ass'n. Wool Mfrs., Vol. XXVII, p. 312.
[73] Ibid., p. 329.
[74] Ibid., p. 238.
[75] Tariff Acts of the United States, 1789–1909, pp. 578–581.

The predominant position of the far West was firmly established during these years, the important gain being in the north Rocky Mountain States, while there was some decline in the south Rocky Mountain States and a considerable falling off in the Pacific States. The last great area of unoccupied land was in the Northwest, and here the ranges were not fully stocked until about the end of the period under consideration.[76]

The discussion of the difference in cost of production at home and abroad featured largely in the revision of 1909. A great many figures on domestic costs were submitted to the Ways and Means Committee. The expense of running sheep was variously estimated at from $1.50 to $2.70 per head.[77] The estimates of the cost of wool varied widely and were rather indefinite, partly on account of the lack of any agreement upon a method of ascertaining it. The increase in cost, due to necessity of utilizing deeded land,[78] to feeding sheep with harvested crops, and to payment of fees for grazing on the forest reserves, was dwelt upon, and the higher wages paid in this country as compared with Australia and New Zealand were cited.[79]

The National Association of Wool Growers and the National Association of Wool Manufacturers joined in requesting that there be no reduction in the rates of schedule K fixed in 1897. They stood upon the "platform" adopted by the Syracuse convention of 1865.[80] The growers again protested against the skirting clause, as in 1897,[81] and the old controversy over carpet wools was renewed.[82]

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[76] The 12 leading States in number of sheep at four different dates have been:

In 1840: Maine, New Hampshire, Vermont, Connecticut, New York, Pennsylvania, Virginia, North Carolina, Tennessee, Kentucky, Ohio, Indiana.

In 1870: Ohio, Indiana, Illinois, Wisconsin, Michigan, New York, Pennsylvania, Iowa, Missouri, California, Kentucky, Tennessee.

In 1890: Oregon, California, New Mexico, Utah, Michigan, Indiana, Ohio, Texas, Pennsylvania, New York, Wisconsin, Missouri.

In 1910: Montana, Wyoming, Idaho, New Mexico, Ohio, Michigan, Oregon, California, Utah, Missouri, Texas, Colorado.

The westward expansion of the industry has been interpreted by some to mean that our comparative disadvantage in wool growing on the extensive plan has constantly been growing greater, as the land formerly used for sheep raising has been utilized for agriculture and other purposes. To the opponent of protection this has seemed good cause for ceasing to attempt to maintain the industry, while to the advocate of protection, it has seemed (even if he admitted the premise) the best reason for equalizing conditions, by a duty to offset the lower cost of production of other countries. The difference in point of view is fundamental. It is not strange therefore, considering the importance of the industry and the typical nature of the problem presented, that there should have been so much agitation of the question.

[77] Tariff Hearings, Ways and Means Committee, 1908-09, Vol. V. pp. 5026, 5050, 5070, 5125, 5139, 5142; p. 5000, "Ohio wool can not be produced for less than 25 to 58 cents a pound."

[78] Ibid, p. 4986, "With the advent of the dry farmer the range is growing less each year."

[79] Ibid., p. 5224.

[80] Ibid., p. 5330. The Missouri sheep breeders asked for an increase in the duty on account of the increase in costs. Ibid., p. 4988.

[81] Ibid., p. 4982.

[82] Ibid., pp. 5163 and 5175.

There was considerable dissension between the woolen manufacturers and the worsted manufacturers at this time. Some of the former protested that they did not intend to join the worsted manufacturers and growers in the resolutions favoring the retention of the old scale of duties.[83] They argued, as in 1897, that the lack of a double duty on Class II wools and the discrimination in favor of the lighter-shrinking wools by the use of specific rates, gave the worsted manufacturers an advantage in competition, while the latter replied that the importations of Class II wool were inconsiderable, and that "it was utterly beyond human ingenuity to devise a satisfactory system of compensatory duties if built upon a basis of ad valorem rates."[84]

The rates on wool were maintained, in this revision, as they had stood in the act of 1897.

Tariff bills were introduced into Congress in 1911 and 1912 in which the rate on wool was reduced to 20 per cent ad valorem, but both of these bills failed of passage. The Tariff Board report on schedule K, which has been considered elsewhere in this report, was made in 1912. In 1913 the National Association of Wool Growers, realizing that a reduction was inevitable, favored the imposition of a duty of 18 cents a scoured pound on wool,[85] the adoption of the scoured basis for the duty being in accord with the findings of the Tariff Board. Wool was placed on the free list at that time. The history of the industry since that date has already been treated in preceding chapters.

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[83] Ibid., p. 5365. Letter of Edward Moir.
[84] Ibid., p. 5481.
[85] Tariff Hearings of Ways and Means Committee, 1913, Vol. IV, p. 4219.

Chapter 18.

CLASSIFICATION OF WOOL AND BASIS OF IMPORT DUTY.

There are many different kinds and a great number of qualities of wool, separated each from the other by slight yet distinct gradations. The standard samples which were used in classifying wool at the principal customhouses of the United States before the removal of the duty in 1913 were 381 in number, and in addition there were 78 samples of wool waste of various kinds and of goat and other animal hair. Wool varies not only according to the breed of sheep from which it has been shorn but also according to the climate where it has been grown, the pasturage of the sheep, and the care given them.

CHARACTERISTICS OF WOOL.

Wool has a number of characteristics which make it one of the most valuable fibers. It is a poor conductor of heat, is very durable, and it also absorbs moisture readily;[1] the first two of these qualities render it excellent for making clothing. A large amount of grease is secreted by the glands around the roots of the wool, and this serves as a protection to the fibers and prevents felting.[1] "Cotted" fleeces are those which lack sufficient natural grease to keep them from matting together. While it is not desirable for the fleece to become matted together on the sheep's back, the property of felting is one of the important characteristics of wool. During manufacturing and finishing processes the scaly, gelatinous structure of the fibers causes the wool to become softened and it can then be felted. "Kempy" fleeces are those having hairs which can not be removed in mill processes, and which resist dyeing and thus cause imperfections in the fabric.

Scoured wool varies in color from pure white to reddish brown, or, in some cases, black. The fiber usually is quite elastic, but in tensile strength is inferior to most other textile materials. The fine Merino wools have a pronounced crimp, while the so-called "long wools" are wavy and lustrous. All these various qualities vary so greatly in each assortment which is placed on the market that very great care is required in selecting wool, in order that the raw material shall be well suited to the making of the particular kind of cloth desired.

[1] Bowman, F. H.: The Structure of the Wool Fiber, pp. 49, 50.

Merino Wool.

The finest wool comes from Merino sheep, which originated in Spain, but which have been taken to many parts of the world and have undergone, in their new habitats, changes and variations in the process of selective breeding. Merino sheep are small, but their fleece is very dense. The wool is usually heavy with grease and dirt. The fleece is naturally very oily, and the oil helps to preserve the elasticity of the fiber, but a large portion of the dirt which comes in contact with the fleece sticks to the outer part of it, while the underportion of the wool is comparatively clean. Merino wool, therefore, sometimes shrinks in weight as much as 75 or 85 per cent in "scouring," though 60 per cent is nearer the average. The numerous scales of good Merino wool give it a felting quality which adapts it to the manufacture of fine woolens.

Merino sheep are very hardy and thrive under seemingly unfavorable natural conditions. This fact, together with the superior quality of the wool and the herding qualities of the sheep, has made the breed a favorite wherever sheep are grown primarily for wool. The various modifications of the Merino for breeding (along straight Merino lines) have not changed the essential character of the fleece. In the middle of the eighteenth century some of these sheep were taken to Saxony, where the "Saxon Merino" was developed.[2] The wool of this variety of sheep was of the finest grades and was referred to in the American market as "Picklock." The "Rambouillet" is a French variation of the Merino type, and predominates on the western ranges of the United States where fine wool sheep are run.

The Merinos were brought to the United States from Spain in 1802 by Col. Humphrey, of Connecticut, and were later developed into a famous breed known as the Vermont Merino. The fleece of these sheep was unusually heavy. This was the wrinkly type of Merino which was later exported to Australia, and there used by flock owners to increase the weight of their fleeces. The breed was well adapted to the rigorous winters of Vermont, but not so well to the heat and droughts of Australia. It has on that account been largely given up by the Australian sheepmen, although a large infusion of the Vermont Merino blood still remains in some of the Australian flocks.

The Vermont Merino is also known as the "type A" Merino. The "type B" Merino was less wrinkly and the "type C," similar to the Delaine, has the wrinkles or folds only about the neck. "Type C" was developed by the flock owners of the upper Ohio region. It has continued to be popular there, and until recent years has found favor to some extent in the far West. It shears the strongest Merino wool in the world.

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[2] Hart, Stanley H.: Wool, p. 7.

Many different varieties of Merino wool may come from the same part of the world or from contiguous territories. It is found, for example, that in Australia, the great Merino wool-producing section of the world, there have been developed three distinctly different types of the Merino sheep, namely, the finewool sheep, which live on high land within the Temperate Zone; the "medium wools," which are grown in parts of the country less favorably situated but nevertheless having rich pasturage; and the "strong wools," which live on the great "out back" plains where the weather is sometimes very hot and the forage sparse.

The location where Australian wool was grown is usually indicated by the name of the port where it is sold, but this is not always the case. For example, while most wool grown in New South Wales is known as "Sydney" wool, some of it goes to Melbourne (Victoria) and is sold as "Port Philip," and some goes to South Australia and is sold as "Adelaide."[3] Merino wool of superior quality is grown in New South Wales, but the West Victorian wool has been a favorite for importation into the United States on account of its light shrinkage as well as its high quality. The south Australian wools are "stronger" than those of other sections. They are long and sound, but contain much "yolk" and sand and consequently have a heavier shrinkage. The conditions in the States of Queensland and western Australia vary a great deal from section to section, and the wools grown there are consequently not so uniform in quality. Some of the wool of Queensland lacks strength, having been grown in a country where the sheep could not find sufficient feed to nourish them properly. Much of the western Australian wool is too dry and contains a great deal of dirt. Tasmanian Merino wool is usually of very high quality.[4] Australian Merinos are unsurpassed, except possibly by fine Ohio Delaines and some American range clips of superior grade. Some Merino wool of a very excellent sort also comes from South Africa. The best Cape wool is very fine and silky, but it is sometimes unsuitable for combing and is of heavy shrinkage.[5] South American Merinos are of lower quality and are used to blend with Australian wools to lower the price of the product.

Territory Wools.

The wools grown in the far western or "range States" of the United States are known as "Territory" wools. While the general character of all these wools is somewhat similar—they are wools with Merino characteristics—they vary considerably according to

[3] Baker and Priestly: Wool Carding and Combing (London, 1910), p. 60.
[4] Ibid., p. 61.
[5] Ibid., p. 68.

the section of the West where they are grown.* These wools are discussed at length in Chapter 11, page 255.

English Wools.

The "English breeds" of sheep form a distinct group especially noted for excellent mutton qualities and good, though for many purposes not the finest, wool. The two main classes of English wools are the "long wools" and the "Down wools." The long wools are "combing" wools produced principally by the Lincoln, Leicester, Cotswold, and Kent or Romney Marsh, sheep. The wools of this group are noted for luster and brilliancy as well as for length. The fiber is from 6 to 15 inches long. They are strong and coarse and make lustrous dress goods and braids of excellent quality.

The Down wools are shorter than the varieties just described and not so coarse. Most of them are long enough to comb with the modern machinery. The fleeces usually contain less oil and dirt than Merinos. The greater popularity of the "Down" sheep is, however, due to their excellent mutton-producing qualities, combined with a fairly heavy fleece. The "Downs" are generally considered to be the best mutton sheep in the world. The leading breeds of "Down" sheep are the Southdown, Shropshire, Hampshire, Oxford Down, Suffolk, and Dorset.

There are many other breeds of sheep which have attained local popularity in Great Britain. Of the "longwool" kind there are the Wenslydale (Welsh) and the "Devon long wool." The Hardwick is a mountain breed with a hairy wool. Others are the Exmoor, the Kerry Hill, the Lonk, and the Irish Mountain sheep.

Wools of Scotland.

The wool of the Blackfaced Highland sheep is coarse and is used principally for carpet making. The Cheviot breed of southern Scotland produces a soft wool of 3 to 4 inch staple, which has become famous through the "Cheviot" cloths. In addition to the pure-bred Cheviot there are, on the Scottish border, many crossbred sheep of mixed Cheviot and Leicester blood which produce a wool from 3 to 5 inches long, used by British manufacturers in making high-class tweeds.

Crossbred Wool.

The "crossbreds," as the term is commonly used in the United States, are sheep partly of Merino and partly of "English" blood. The "crossbred" has the size and weight which make it a good mutton sheep, while its wool retains, to a varying degree depending on

* The term "Territory" wools was used in the days before the Western States had been admitted to the Union and has continued in use.

the breeding, the fineness and elasticity of the Merino. These wools are becoming increasingly important as mutton production grows in many sheep-raising countries. The place in the American sheep industry of the crossbreds, and of the pure mutton breeds as well, is clearly shown by a number of quotations from authorities on the subject.[7]

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[7] Opinions of ten authorities regarding the future of the sheep industry of the United States:

"Although sheep breeders have by no means ceased to pay attention to wool, yet it is perhaps safe to say that the day of improvement, as characterized by an attempt to get into the fleece the maximum of fineness, length, and weight, has begun to wane * * *. This is a pretty sure indication of either a check to progress in wool improvement through breeding, or of a readjustment of the notions of wool improvement. In the writer's opinion it is an indication of the latter.

"A desirable combination of mutton and wool is still a large breeding problem on the ranges of the United States. As yet a type possessing what is desired in wool and mutton properties, together with certain other characteristics, has not been fixed, but the Federal Government is directing work along this line." Prof. W. C. Coffey, University of Illinois, Productive Sheep Husbandry, 1919, Chapter III.

"Production of wool is a national necessity, but wool can not continue to be produced unless we have a larger market for our lamb product." Frank J. Hagenbarth, President of National Wool Growers' Association, in the National Wool Grower, June, 1919, p. 11.

"It is now a recognized fact that the future sheep industry of the country must be under farm conditions.

"It is only a question of time when the increasing populations of South America, South Africa, and portions of Australia will cause the sheep industries of those countries to also undergo a transposition from the range to a farm basis.

"Australia and South Africa are the only countries to-day where Merino or finewool blood predominates, and the tendency toward crossbreds for mutton is increasing, especially near the coast, where the freezing works are located.

"South America, New Zealand, Great Britain, and Canada breed more for mutton than wool.

"The tendency is undeniably toward mutton types." Stanley H. Hart, wool expert of Philadelphia Textile School; World Wool Demands, in American Sheep Breeder and Wool Grower.

"Of recent years, range sheepmen have turned their attention more to the mutton end of their business than formerly. Americans are learning to eat mutton more and more every year, and the long-headed men in the sheep business saw where they could have two strings to their bow by looking after the mutton business as well as raising wool." Will C. Barnes, Bureau of Forestry, U. S. Department of Agriculture, Western Grazing Grounds and Forest Ranges, in The Breeders' Gazette, 1913, p. 390.

"Students of the economics of the situation suggested a way out through a reversal of the factors, setting mutton to the fore as the prime product, with wool as the by-product.

"Since that day, flockmasters, driven by the stern necessity of competition, induced by the demand for wool at a price which made it available for general use, have steadily set their faces toward reading the major profit from the flesh of the sheep, and the minor profit from its fleece.

"The computation at the present reveals the steadily-moving revolution toward a condition wherein fleece shall be counted largely as a by-product.

"Whether it will continue under the conditions that will follow the war is purely speculative, dependent wholly on what those conditions may prove to be, but in the normal drift of economic production the dual profit must be depended on, with mutton as the major factor." Wool as a By-Product, editorial in The Breeder's Gazette, Aug. 15, 1918, p. 230.

"In the great sheep-growing countries there has been in recent years a very pronounced tendency to breed crossbred and coarser wools, due to the development of a broad, profitable market for mutton and aided by a strong demand for the coarser fabrics in the goods trade." Roscoe Wood, The Future of the Finewool Sheep, in The Shepherd's Journal, April, 1913, p. 11.

"There is a distinct change from the range type of wool growing to the paddock and farm types and from the Merino strain to crossbred sheep in most of the important wool-growing countries. The conditions which make the range type of sheep raising impossible

Sheep having less than one-fourth Merino blood yield coarse crossbred wool, which is lustrous and strong, but harsh and of poor felting quality. Sheep having one-fourth to one-half Merino blood usually yield medium crossbred wool, which is soft, strong, and of fair felting quality. Fine crossbred wools generally come from sheep having

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do not apply with equal force to either the paddock or farm type. At the same time the general increase in the value of lands, and the consequent rise in the cost of cattle production, has strengthened the demand for mutton as a source of meat.

"The growing of territory wools under the old range conditions has evidently passed its maximum.

"The tendency to increase the mutton strain has been accelerated even in the Rocky Mountain section." Paul T. Cherington, secretary, National Association of Wool Manufacturers, Economic Aspects of United States Wool Industry, in The American Sheep Breeder and Wool Grower.

"Some may say that there is not much profit in sheep because the wool has gone down in price since the tariff has been taken off. This, of course, is true of the sheep which are raised mainly for their wool, but the mutton breeds do not suffer much under this tariff, for mutton should always be the first consideration and wool only second as a by-product." Prof. Frank Kleinheinz, University of Wisconsin, How to Handle Sheep for Profit.

"In general the primary purpose of sheep growers has been to produce wool. This can not be attained profitably on high-priced land. Naturally, therefore, with the increase in land values there is a rapid decline in the number of sheep. In Great Britain meat has been the principal product and wool the by-product, and the sheep industry has flourished.

"If American farmers will follow the British custom, the industry can be put on a profitable and permanent basis. The greater number of sheep in Great Britain are raised in the hills and on land comparable to much of the waste land of American farms. The areas in this country, especially in the East and in parts of the South, now relatively little used, can profitably be devoted to sheep production if the farmers will secure the proper breed of sheep. Sheep also can be made profitable on higher-priced land, as British experience shows.

"It is to our settled areas, particularly in the Central, Southern, and Eastern States, that we must look for an increase in the number of sheep." Report of the Secretary of Agriculture, David F. Houston, 1916, Yearbook of Department of Agriculture, pp. 30–31

"The sheep industry of the United States is in a state of transition. In most of the western range States the number and size of flocks continue to decline. In the farm States there is a distinct trend toward the more general production of wool and mutton.

"This movement, though accentuated by war conditions and prices, did not originate with the war. It had its beginning much earlier and may be expected to continue after peace is restored.

"There is very little resemblance between the former business of growing wool and the present rapidly developing business of keeping sheep for the economical production of meat as well as wool.

"The type of sheep raising now engaging the interest of farmers is essentially new. It has never been tested in a large way in the United States and has never been abandoned anywhere when once established.

"Students of world wool-trade conditions are convinced that future wool supplies must come largely from farm flocks.

"A smaller and diminishing margin between supply and consumption of wool seems inevitable. It is not possible to see how this tendency can fail to cause a new level of values for wool unless civilian consumption is very greatly curtailed.

"The range product has been declining in all countries except South Africa and New Zealand. A portion of this decline in range production in the United States may be offset by improved methods and the revision of State or National attitudes on public land policies, but it is probable that much more of the wholly unimproved lands now used for grazing will be settled before a condition is reached under which each type of land is employed in the most economical way.

"The still more intensive use of land in farms, and effort to secure the most economical use of every acre, every facility, and all available labor, will necessitate the general inclusion of sheep in our system of mixed farming and livestock production.

"The raising of sheep has a new appeal to older farming areas as a result of alterations in feed values and the scarcity of farm labor. * * * The most valuable car-

more than one-half Merino blood. The wool has a good crimp and good felting properties, but is not so lustrous as the longer wools.

A cross between the longwools and Merinos is favored in the parts of Australia where the soil is fairly rich, while in the other sections where crossbreeding has been adopted, the cross between Downs and Merinos is popular. One method of combining the mutton and wool characteristics which has been successful in Australia is to cross the Lincoln and Merino breeds, using a Lincoln ram twice, and then a Merino ram twice, the fourth generation being the "fine comeback," which is a fine three-quarter-blood Merino. This is, however, rather more of a wool than mutton type. The Lincolns and Leicesters are the favorite longwools for crossing, while the Shropshire is one of the

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carcasses of lamb and mutton require a very much smaller proportion of fat and therefore a smaller use of grains than is required in other meat animals. * * * The other prominent economic advantage of sheep raising is in the comparatively small demand it makes upon farm labor. The labor cost per dollar's worth of wool or lambs is lower than in any other farm-animal product.

"An indication of the probable development of sheep raising may be obtained from a study of the data concerning British agriculture and livestock. In many respects the agricultural conditions of the 14 Northeastern States of this country are comparable with those of Great Britain. Both areas contain a large amount of nonarable land and have large populations and manufacturing industries. The fact that the British agriculture is much older and has developed under conditions of competition with other countries insures that each of its branches has a sound economic basis.

"There is still need of publicity and educational work regarding the safety of engaging in sheep raising. The long-continued circulation of misleading ideas as to the meaning of the history of the business in this country and as to the true economic place of sheep can not be quickly overcome.

"The prospects of a new and large sheep husbandry are chiefly along the line of producing lambs and wool—the lambs to be sold before reaching their sixth month.

"A larger development of the farm sheep industry than that reported for 1917 is to be expected. The continued development of this phase of animal husbandry will contribute materially to the food and clothing supplies. It will also add stability to our systems of farming and play an important part in the more complete utilization of our agricultural resources."

The increasing public taste for mutton and lamb is hastening the readjustment of the industry. The National Wool Growers' Association has an "Eat More Lamb" publicity campaign under way. The Department of Agriculture recognizes the change in conditions and through the publications of the Bureau of Animal Husbandry is pointing out to sheep owners, present and prospective, that they must look to the production of meat for the larger share of their profits. They are devoting much effort to the development of suitable breeds (e. g., the experiments with Corriedales on the Government sheep farm at Dubois, Idaho) and to the dissemination of correct ideas among stock owners. F. R. Marshall, in charge of Sheep and Goat Investigations, Bureau of Animal Husbandry, Sheep and Intensive Farming, Yearbook of the U. S. Department of Agriculture, 1917, pp. 311–320.

"Any pronounced increase in the number of sheep kept in the United States * * * must take place largely in the 'farming' States, the region east of the Rocky Mountains. Such an increase must also be based on the mutton types of sheep with the possible exception of the Ohio district. * * * Considering all the factors, it seems logical to look for a steady, though slow, increase in the number of sheep in most of the farming States east of the mountain district, an increase made up largely of sheep kept on small farms as a minor enterprise for the utilization of products of low value which otherwise would largely be wasted or less fully used. * * * The economy of small mutton flocks fed largely with forage which otherwise would be less completely used, and the production of heavy lambs with a minimum of expensive grain feed, has finally become plain to the American farmer. A new phase in the history of our sheep industry is now developing. This is the return of sheep to the farm." L. G. Connor, A Brief History of the Sheep Industry in the United States, Annual Report of the American Historical Association, 1918, pp. 157, 160, 165.

most popular of the Downs. Nearly the entire clip of New Zealand is crossbred, and the favorite breed is the Romney Marsh. In South America the Lincoln has been much used for crossing with Merinos. The Cotswold, a longwool, and the Hampshire, a Down sheep (used for production of market lambs), are popular for breeding purposes in the range States of the United States, while the Rambouillet is the most popular variety of the Merino in that section.

The Corriedale, a breed developed in New Zealand since 1880, by breeding Lincoln and Leicester rams to Merino ewes, and then breeding the hybrids together, has become a fixed type. It combines a medium fleece, of 10 to 12 pounds in weight, with excellent mutton conformation.[8]

Pulled Wool.

Wool pulled from the skins of slaughtered sheep is not quite so desirable, for most purposes, as the same wool would be if sheared from the live sheep. The process of pulling detracts from the spinning quality of the wool as it damages the serration of the fibers. Pulled wool also dyes less satisfactorily because of the action of the chemicals used on the skins in the process of pulling.

Pulled wool is used for soft twist knitting yarns, for blankets, carpets and rugs, woven paper-mill felts, and flannels. The short pulled wool (taken from sheep sheared not long before slaughtering) is used in making felt for hats, while the longer fiber is often used for warp yarns. Pulled wool for the most part is a by-product of meat packing, Chicago being the principal seat of the industry. Kansas City, New York City, Philadelphia, and Boston also have important "pulleries." The average domestic output is about 40,000,000 pounds a year.

The principal foreign source of pulled wool is Mazamet, France. In 1910, 43,940,000 pounds of washed pulled wool and 11,782,000 pounds of scoured pulled wool were shipped from Mazamet. England took about 65 per cent of this total. Australia, Argentina, Germany, and Austria also have wool-pulling establishments.

Scoured Wool.

The natural wool grease, potassium salts, or suint (dried perspiration), dirt, and vegetable matter such as burs must be removed before wool can be carded or combed. The greater part of this matter is removed in the scouring process, which consists of washing the wool fiber in a bath of chemicals and water. The loss in weight through the removal of these substances is large, averaging about 55 per cent. As a rule, the finer the wool the heavier is the shrinkage.

Washed Wool.

Washed wool is wool which has been cleansed with water only either before or after shearing. Some of the dirt and the potassium salts

[8] Coffey, W. C.: Productive Sheep Husbandry, p. 180.

can be removed in this way, and the shrinkage usually amounts to 15 or 20 per cent. Before this wool can be used in manufacturing, however, it must be scoured in the same manner as grease wool.

Most of the domestic manufacturers prefer to scour in their own mills the wool which they use. An independent wool-scouring industry has begun in a small way, but its production is only a small percentage of the domestic consumption.[9]

Mohair.

Several other animal hairs which, in the tariff acts were formerly classed with wool, should be described here. They should, however, be treated apart from wool in any future tariff revision, if the method described below of levying a duty is adopted.

The hair of the angora goat, native of Asia Minor, is known as mohair. This fiber is soft and silky, white and lustrous, and 12 months' growth is from 6 to 12 inches in length. The mohair from the southwestern part of the United States is usually shorter, as the goats are sheared twice a year. If this is not done the goats shed hair on account of the warm climate. The average weight of an angora fleece is about 3 pounds—much less than the average weight of the fleece of a sheep.

Mohair is used for making plush for car seats, for upholstering furniture, for coat linings, dress goods, automobile tops, rugs, carriage robes, imitation furs, and other products. The market for mohair is closely dependent upon the fashions. It is generally conceded by manufacturers that the domestic product is not so lustrous and does not spin so well as the Turkish hair, although the domestic product has improved during the past few years, both in length and in quality.

Alpaca, Vicuna, and Llama Hair.

Alpaca is the hair of the animal of that name found in Peru and Bolivia. It is 10 to 16 inches in length, and, though much like the better grades of mohair, is finer, softer, and less lustrous. The reddish brown hair is more valuable than the white hair. Vicuna is a fine, soft fiber, reddish brown in color, and like alpaca but shorter and softer. Llama hair is coarse, short, brown hair, simi-

[9] Under the tariffs of 1897 and 1909, which taxed scoured at three times the duty on grease wool, the importations of wool in the scoured condition rarely amounted to more than a few hundred pounds. Under the tariff of 1913, which made no discrimination between scoured and grease wools, there was a considerable increase in the importations. From a few hundred pounds a year they increased to over 6,000,000 pounds in the seven months from December, 1913, to June 30, 1914. In the fiscal year 1916, 37,500,000 pounds of scoured wool were imported; in 1917, 7,000,000 pounds; in 1918, 24,000,000 pounds; and in 1919, nearly 25,000,000 pounds. To a considerable extent this increased importation of scoured wool in the last few years has been due to the lack of shipping space.

lar to alpaca. The uses of these hairs are similar to the uses of mohair.[10]

Camel's Hair.

Camel's hair is of two sorts, the soft, fine under hair, which is about 2½ inches long and is of a yellow or brown color, and the outer hair, which is 4 to 12 inches long and is coarser and of a darker color. In this country the principal use of camel's hair is for making press cloth for cotton seed and linseed oil compresses. The decrease of imports and the increase in price of camel's hair have caused manufacturers of press cloth to utilize human hair. It is also mixed with wool or cotton for making robes, rugs, blankets, and novelty fabrics.

Most of the camel's hair used in this country, before the war, came from Russia and China, the former country being the most important source. Russian camel's hair came in under Class III before 1913 and was dutiable at 7 cents a pound, being valued at more than 12 cents a pound. All other camel's hair came in under Class II and was dutiable at 12 cents a pound.[11]

MISCELLANEOUS DEFINITIONS.

There are several terms which are used so frequently in connection with the subject that they should be carefully defined.

Teg, hogg, or hogget wool is an English term meaning wool produced on a year-old sheep which has not previously been clipped.

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[10] There is no domestic production of alpaca, vicuna, or llama hair. The amount of mohair sheared in the United States in 1900 was 961,000 pounds, valued at $268,000: in 1910, 3,779,000 pounds, valued at $902,000. The output in 1914 was estimated at 4,500,000 pounds, and in 1915, 1916, 1917, 1918, and 1919 at about 6,000,000 pounds per year. Texas, Oregon, New Mexico, California, and Arizona lead in the production of mohair. Kansas City is the leading goat market of the United States.

South Africa, which has 4,000,000 angoras, leads in the production of mohair. There are more pure-bred goats there than in Asia Minor, where the species originated. Turkey and South Africa have prohibited the exportation of these animals, but before they did so the United States had imported many valuable goats. The annual clip of South Africa is estimated at 25,000,000 pounds and that of Turkey at 12,000,000 pounds.

Bradford, England, is an important mohair-manufacturing center.

Mohair, alpaca, etc., imported for consumption in 1910 amounted to 1,969,919 pounds, valued at $682,014, which was 52 per cent of the amount of domestic production. In 1914 the imports were 3,555,950 pounds, valued at $1,160,391. In 1917 they amounted to 9,367,801 pounds, valued at $3,501,808, and in 1919 to 6,123,123 pounds, valued at $3,471,286. Most of the total consists of mohair. The imports of mohair originate principally in Turkey and South Africa. The greatest amount comes as a reexport from Great Britain in normal times, though during the war large amounts were shipped directly from South Africa. A million pounds of alpaca is about the average importation of that fiber, while very little llama or vicuna finds its way to this country.

[11] The United States imported over 3,000,000 pounds of Russian camel's hair a year, on the average, before 1914. After the war began the imports decreased by about one-half, and in 1917 and 1918 fell to a low point, less than 300,000 pounds being imported in 1918. In 1919 the imports of this class increased to 790,000 pounds. Imports of Class II camel's hair remained about the same—838,082 pounds in 1913 and 925,250 pounds in 1918—but fell to 330,036 pounds in 1919. The value per pound of Class II imports of camel's hair increased from 26 cents in 1913 to 50 cents in 1918, and of Class III imports (washed and unwashed) from 17 to 43 cents.

The fiber of this wool tapers toward the end. "Lamb's wool" is wool removed from the lamb before it is a year old. "Shurled hogget" wool (also an English term) is the first fleece from a sheep after it has been shorn as a lamb. "Mestiza, metz, or metis wools" is an obsolete term which was formerly used to designate the wools produced in South America by a sheep which was a cross between a full-blooded Merino and the "Criolla" or native sheep. The term is mentioned here because of its survival until a recent date in the tariff laws of this country.

A few terms connected with wool manufacture should be mentioned: "Noils" are the short fibers removed from wool during the operation of combing. Mungo is made by grinding up rags and tailors' clippings of hard worsted and woolen cloth. Shoddy is made from the rags and tailors' clippings of soft goods, such as stockings. Shoddy fiber is longer and coarser than mungo fiber. "Wool extract" is made of wool obtained by carbonizing mixed goods made of cotton and wool. "Flocks" are the waste produced by the processes of milling, shearing, and raising cloth, or, in some cases, by carbonizing bur waste.

The terms "warp" and "weft" are sometimes applied to qualities of wool. The former is stronger than the latter, as the warp has to resist more strain in the process of weaving and is subjected to the friction of the flying shuttle.

CLASSIFICATION IN UNITED STATES TARIFF ACTS.

The "blood" classification of wool, or classification according to the breed of sheep on which it was grown, was the plan adopted in 1867 when the wool schedule took the form which it kept, in substance, for 46 years. Three classes of wool were established by this act: Class I, wool showing any trace of Merino blood and Down clothing wools; Class II, combing wool from the "English" breeds of sheep; and Class III, "native" wools—that is, wools from unimproved breeds of sheep. The attempt was made to describe these classes more accurately by designating Class I as "Clothing" wool, Class II as "Combing" wool, and Class III as "Carpet" wool. When the classification was adopted this was substantially accurate, as fine Merino wool was used for carded woolen goods, or "cloths," but could not be combed for use in making worsteds, while the "native" wools were used almost altogether in the manufacture of carpets.

The act of 1867 described the classes of wool in yet another way by adding to the classification an enumeration of the countries from which each class was commonly imported. In the act of 1867 there was, thus combined into one, a threefold classification—on the basis of blood, of purpose for which used, and of country of origin.

It is obvious that a classification of this sort would be likely to embody inconsistencies and it was not long before they became apparent. The first part of the classification to become obsolete was the division of the wools into "clothing," "combing" and "carpet" wools. Merino wool is short (the "staple," or length of fiber, rarely being more than 2½ inches), very highly crimped, elastic, and oily. At the time when the act of 1867 was passed Merino wool was used in making broadcloths and other carded woolen goods, but it was not feasible to comb the short and kinky fibers. "Combing" wool comprised the wool from the English breeds of sheep, chiefly the long-wools. This variety of wool is long stapled (5 to 15 inches) and the fiber is coarser, and not so curly. It was, at that time, the only wool which could be used in making worsted yarns. The "carpet" wools were inferior grades, coming from many parts of the world—from Russia, Asia Minor, China, and various other regions.

The distinction between "clothing" and "combing" wools largely lost its significance about 50 years ago with the invention of machines which could be used to comb fine Merino wool of about 2½ inches in length, making it available for use in the manufacture of worsted yarns. The term "carpet" wools also became something of a misnomer with the increasing use of the better sorts of wool from "native" Asiatic and other unimproved sheep for mixing with the higher grades of wool in making yarns to be used for purposes other than carpet manufacture. Furthermore, when low crossbred wool is cheap it is utilized to some extent for this purpose. With the passing of these distinctions the division under Schedule K became, in 1890, merely "Class I," "Class II," and "Class III," instead of "Class I, clothing wool," "Class II, combing wool," and "Class III, carpet wool." In Class I remained, however, all wool from sheep having a trace of Merino blood. In Class II was placed all wool from sheep of the English breeds, and in Class III the great variety of wools from "native" sheep of Russia, Asia, and other parts of the world. This was the classification in the tariffs acts, with the exception of the act of 1894, until wool was placed on the free list in 1913.

The imports of Class II wool have been small in proportion to the total imports and the utility of a separate classification for such wools long ago became doubtful. The imports of wool are really of two classes, and only two, namely, wool suitable for making wearing apparel and "all other" wools. According to a strictly logical classification, which, it may be said at once is not necessary to adopt in full for tariff purposes, these kinds may each be subdivided into fine, medium, and coarse wools. Each of these grades could be further subdivided into carding wool and combing wool. The primary classification into "wool suitable for making clothing" and "all other" is the only

classification necessary for tariff purposes.[12] One difficulty would be that some of the better wools, of the sort formerly known as "Class III wools," are used in making clothing, while some "tags" and "off-sorts," and some of the lowest crossbred wools are scarcely better than the "native" wools. Although there would be something in the nature of a "twilight zone" between the two classes, the division would nevertheless be a logical one.

While it is not necessary to adopt a complicated classification for tariff purposes, it is desirable, in order to make the situation clear, to enter into a somewhat detailed discussion of the use of terms in describing wools and the international equivalent between grades.

SYSTEMS OF WOOL CLASSIFICATION.

The principal systems of wool classification are the "Boston," the "Bradford," and the "International" systems. An explanation of the terms used in Boston in grading "Territory" wool (i. e., wool from the western range States)[13] is given in the following tabular statement:

BOSTON GRADES.	DESCRIPTION.
Braid	Wool from pure Cotswold or Lincoln ewes.
Low one-quarter blood	Nearly pure Cotswold or Lincoln. Supposed to be one-eighth Merino blood.
One-quarter blood	Wool equivalent in grade and similar in quality to that from sheep of one-quarter Merino blood.
Three-eighths blood	Wool equivalent in grade and similar in quality to that from sheep of three-eighths Merino blood.
One-half blood, staple	Wool equivalent in grade and similar in quality to that from sheep of half Merino blood (combing).
One-half blood, clothing	Short wool equivalent in grade and similar in quality to that from sheep of half Merino blood.
Fine medium, staple	Long wool from pure or nearly pure Merino sheep (combing length).
Fine medium, clothing	Short wool from pure or nearly pure Merino sheep.
Fine staple	Superfine combing wool from pure bred Merino sheep (occasional).
Bucks, fine	Wool from Merino rams.
Bucks, braid	Wool from Lincoln or Cotswold rams.
Black	Wool of any grade from black sheep.
Tags	Broken pieces.
Locks	Smallest fragments of inferior wool and sweepings.

NOTE.—Belly wool in old-fashioned sheds is shorn attached to the fleece and remains so until separated by the mill sorter. "Fine Staple": Only a limited quantity is found in territory wools, frequently not sufficient for a separate grade. Half-blood clothing is rapidly decreasing, owing to improved breeding and also to improved combing machinery.

[12] This statement is subject to some qualification. See succeeding pages in this chapter.
[13] Statement of W. T. Ritch, associated with First Wool Brokerage Co., Boston.

The "Bradford" System.

This is a system for the classification of worsted yarns. Under it the unit is a hank of yarn, 560 yards long, weighing 1 pound. Such yarn is known as No. 1, or "1 count." If it takes 2 hanks of yarn each 560 yards long to weigh 1 pound such yarn is No. 2, or "2-count" yarn. Yarn of such low "count" is, however, never made. If it takes 40 hanks to weigh 1 pound, such yarn is 40-count, or 40s yarn. Thus, the finer the yarn, the higher the "count." This system is applied to wool. Thus, the wool classified as 40s, 60s, or other number means that it will spin into 40s, 60s, or other "count" of yarn, provided it has sufficient length.

Other Systems.

There are other systems of classification which are similar to the Bradford system, although that is the one most widely adopted. The "run" system is used in the United States (except in Philadelphia) for classifying woolen yarns. One thousand six hundred yards, equaling 1 pound, make a "1-run" yarn; 3,200 yards, equaling 1 pound, a "2-run" yarn, etc. There is also the "cut" system, which is used in Philadelphia for classifying woolen yarn, in which 300 yards, weighing 1 pound, make a No. 1 "cut."

Equivalent Grades.

The following table has been drawn up to indicate equivalents between the international terms, the Boston terms, and the spinning counts which are used in classifying wool. This table is not exhaustive, as the Ohio region wools of the United States are graded by a different set of terms, and South American wools by yet another system.[14]

TABLE XCVI.—*Explanation of wool terms.*[a]

[Equivalents.]

International terms.	Spinning counts.	Boston terms.
	36s to 40s	Braid.
Strong ¾ bred (occasional)	40s to 44s	Low ¾ blood.
¾ bred	46s to 50s	¾ blood.
Half-bred	50s to 56s	½ blood.
Comeback	58s to 60s	½ blood, staple.
	58s to 60s	½ blood, clothing.
Merino, combing	64s to 74s	Fine and fine medium, staple.
Merino, clothing	64s to 74s	Fine and fine medium, clothing.
Rams, Merino	64s to 70s	Bucks, fine.
Rams (longwool)	36s to 44s	Bucks, braid.
Black (crossbred)	46s to 58s	Black.
Tags or stained pieces	36s to 58s	Tags (mixed).
Locks		Locks.
Bellies (Merino or crossbred)		None.
First pieces (Merino or crossbred).		
Second pieces (Merino or crossbred).		

[a] Statement of W. T. Ritch.

[14] The international equivalent of "braid" is the name of the breed of sheep which produced the wool. The same rule applies to all longwooled rams, the name of the breed being branded on the bale of wool, such as Lincoln, Leicester, Romney, or Cotswold.

There are exactly the same number of "grades" in each system of classification and branding. The equivalents, however, should be regarded as approximations because grading in Boston and Philadelphia sometimes varies a little, owing to market fluctuations and changed local conditions. Foreign wool is always classed in accordance with the predominating spinning count in each fleece.

Another table of equivalents, which varies slightly from the preceding, is the following:

TABLE XCVII.—*Comparison of nomenclature of grades of wool in the United States of America with nomenclature of same grades in Great Britain and on the European Continent.*

Commercial name in the United States of America.	Commercial name of same grade in Great Britain.	Commercial name of same grade on European Continent.	Commercial name in the United States of America.	Commercial name of same grade in Great Britain.	Commercial name of same grade on European Continent.
Extremely fine, or XXXX	90s	AAAAA.	¾ blood	56/58s	BC.
Very fine, or XXX	80s	AAAA.	Low ¾ blood	56/58s	C 1.
Fine, or XX	70s	AAA.	High ½ blood	50s	C 2.
Fine medium, or X	64s	AA.	½ blood	50/46s	C 2.
High ½ blood	60/64s	A.	Low ½ blood	46s	D 1.
½ blood	60s	A.	Common wool	44/40s	D 2.
Low ½ blood	60/58s	AB.	Braid wool	36/40s	E.
High ¾ blood	58/60s	B.	Very low wool	32/36s	EE.

The following tabular statement is much simpler and also a rougher approximation, but it is given because it may be used more easily than the longer and more complicated table given above:

English.	American.	English.	American.
64s to 70s	Fine.	42s to 50s	½ blood.
58s to 60s	½ blood.	36s to 40s	Common and braid.
52s to 56s	¾ blood.		

It would be possible, then, to reduce all other classifications to terms of the classification according to spinning counts. This should be borne in mind while considering the suggestions given below in regard to the method of levying a duty on wool.

OLD METHOD OF LEVYING DUTY.

One of the principal criticisms leveled at the operation of the wool duty as it existed before October 3, 1913, was in regard to the discrimination against the heavier shrinking wools. The duty was based on the assumption that wool shrinks 66⅔ per cent in scouring. The duty on Class I wool "in the grease" was 11 cents a pound and on scoured wool 33 cents a pound. The law therefore operated to prevent importation of scoured wool, in addition to putting a premium on importation of the light shrinking wool. It is evident that if a lot of wool shrinks only 50 per cent, the duty on the scoured content amounts to only 22 cents a pound, when the duty is 11 cents per grease pound, as against 33 cents a pound if it shrinks as much as the old tariff law contemplated. The result was that the foreign wools were "skirted"—i. e. bellies and the edges of the fleeces, which contained more dirt, were removed. Further, certain light shrinking wools, like the West Victorian or Geelong (Australian), were much sought after by American buyers, while the "heavier conditioned" sorts were not considered.

Another objection urged by manufacturers was that the law favored the importation of crossbreds more than Merinos, since the former are of lighter shrinkage than the latter. As the world tendency has been toward crossbreds, this would seem to be subjecting American woolgrowers to ever wider competition. Cross breeding has, however, progressed as far in the United States as in any other country except New Zealand. It was thought that this state of affairs penalized the woolen manufacturers more than it did the worsted manufacturers, as the former use considerable amounts of the fine Merino wools. This view of the relative amount of injury done to the woolen and worsted industries, respectively, may be erroneous.[15]

While the manufacturers criticized the law on the grounds outlined above, the woolgrowers found fault with it because the possibility of importation of light shrinking and skirted wools prevented their securing the full amount of the nominal protection to domestic wool. The increase in price of domestic wool attributed to the duty has been estimated at 8 cents a pound.

TARIFF BOARD'S INVESTIGATION OF SHRINKAGE.

The United States Tariff Board in 1911 made so thorough an investigation of the shrinkage of wool that it has not been necessary to conduct an inquiry into this subject at the present time. The tariff board secured returns on the shrinkage of 100,000,000 pounds of wool scoured in both American and European mills. On the basis of these figures, they found that the American purchaser of 100

[15] The idea which has been commonly held is that the wool industry consumes more fine Merino wool and the worsted industry more crossbred wool. Under these conditions a rise in the price of Merino wool would, other factors remaining the same, cause the production of woolens to fall off and the production of worsteds to increase. Conversely an increase in the price of crossbred wool would cause less worsteds and more woolens to be made.

The following quotation from Dalgety's Review (1912–13) gives a somewhat different point of view regarding the uses of the different kinds of wool:

"Last year's robust clip was far more suitable to the worsted than the woolen trade. Nevertheless it has been a woolen rather than a worsted year, not on account of the fashion but because raw wool prices have been on the high side and the process of manufacturing woolens is more favorable to the freer use of shoddy, cotton, and other adulterants, which have one and all been very freely requisitioned. The truth of the matter is that with fine goods in fashion there is not nearly enough Merino wool to go around without the free use of adulterants, a condition of affairs which promises to be more and more accentuated in the future."

"Fine goods," as it is used here, are fine goods of both worsted and woolen. The quotation suggests considerable interchangeability between the various kinds of wool, which certainly must exist if a high price for wool causes more of it to go into woolens and a low price causes more of it to go into worsteds.

The worsted industry has grown to much greater proportions than the woolen industry, and for that reason uses a greater total amount of fine wool than the woolen industry, even though broadcloths, etc., are preeminently the fine wool fabrics. Wool which is quite short can now be combed because of the improvements in combing machinery. A rise in the price of fine wool would have a greater quantitative effect on the worsted than on the woolen industry, as substitutes can more easily be used in making woolens. A high price of fine wool may, therefore, mean a shift toward the woolens. If this is so, then a prohibitive duty on the heavy shrinking wools may be as much of a disadvantage to the worsted industry as to the woolen industry.

pounds of fine fleece (in the grease) secured a yield in clean wool as follows:

	Pounds.
From wool of the Western States	32.75
From wool of the Ohio region	40.00
From wool of Australia	51.78
From wool of South America	52.36

South African wool is of high shrinkage. Though it is valuable for use in making felts and fine woolens, not enough was imported into this country to enable the Tariff Board to secure representative figures on its clean yield.

Helmuth Schwartze & Co., London, informed the Tariff Board in 1910 that less than 20 per cent of the Merino wools produced in Australia, South America, and the Cape would shrink over 65 per cent. Recent development in the "back country" perhaps would suggest some revision of the Board's conclusion as to shrinkage of fine wools in Australia. They also estimated that out of the total production of those countries only 5 to 8 per cent would shrink as much as 70 per cent to 75 per cent. The River Plate wools shipped to Europe contained fully 6 per cent more burs than those sent to the United States. Australian and South American Merinos were entering the American market on the basis of about 21 cents duty on the scoured pound.[16]

There was a similar though not so great discrepancy between the yield of the crossbreds and lower grades of wool grown in the United States and those imported. "The fact is that South American and other foreign wools, in all grades for which trustworthy scouring records were obtained, show a higher shrinkage in foreign mills than in mills of the United States."[17]

Helmuth Schwartze & Co. also furnished the following estimate of the shrinkage of the total wool production of the leading countries, calculated from their circular of March 14, 1911.[18]

The United Kingdom (fleece washed), 25.1; European Continent (fleece washed), 33.33; North America, 54.96; Australasia, 48.54; Cape of Good Hope, 58.4; River Plate, 51.04.

This same firm was asked to prepare two tables. One of these showed the shrinkage of the colonial wools which came within the range of buying possible for American importers under the old tariff. The other showed the shrinkages of wools practically excluded from the American market. There has probably been so little change in the shrinkage of most of these wools that the tables are reproduced herewith.[19]

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[16] Tariff Board Report on Schedule K, p. 384.
[17] Ibid., p. 385.
[18] Ibid., p. 387.
[19] Ibid., p. 386.

TABLE XCVIII.—*Estimate of the approximate shrinkage of the lower grades of colonial grease wools. (Grades practically excluded from the American market.)*

Description according to spinning qualities (counts).	New South Wales.		Victoria (Port Phillip).	Queensland.	Adelaide (red).	West Australia (blue).	West Australia (red).	New Zealand.	Punta Arenas (Patagonia and Chile).
	Monaro (blue).	Albert and Lachlan (red).							
	Per cent.	*Per cent.*	*Per cent.*	*Per cent.*	*Per cent.*	*Per cent.*	*Per cent.*	*Per cent.*	*Per cent.*
Merino:									
Fleece 70s	55-59	56-60	56-60	60-62	60-62	55-57	57-59	56-58	.....
Fleece 70s, very wasty	57-61	59-62	59-62	63-65	63-65	58-60	60-62	60-62	.....
Fleece 64s	54-58	55-58	55-58	58-60	58-60	54-56	56-58	55-57	.....
Fleece 64s, very wasty	56-60	57-61	57-61	61-64	62-64	57-59	59-61	58-60	.....
Fleece 60s	54-58	55-58	55-58	56-58	57-59	56-58	58-60	56-58	.....
Fleece 60s, very wasty	56-60	56-60	56-60	58-60	60-62	60-62	63-65	59-61	.....
Broken fleeces 60s	54-56	52-54	50-52	54-56	56-58	(1)	55-57	54-56	.....
Broken fleeces 60s, wasty	56-58	54-56	55-58	56-58	59-61	.....	58-60	56-58	.....
Crossbred:									
58s	.....	.....	44-46	.....	.....	45-47	.....	45-47	55-57
56s	.....	.....	40-42	.....	.....	42-44	.....	42-44	51-53
50s	.....	.....	38-40	.....	.....	40-42	.....	40-42	48-50
46s	.....	.....	36-38	.....	.....	38-40	.....	38-40	44-46
40s-44s	.....	.....	33-35	.....	.....	.....	.....	33-36	40-43
36s-40s	.....	.....	30-32	.....	.....	.....	.....	28-31	37-39

[1] Too mixed.

CAPE OF GOOD HOPE AND NATAL.

	Per cent.
Karoo 70s, 12 months	63-64
Karoo 70s, very wasty	66-68
East London, 12 months	64-66
East London, very wasty	68-72

TABLE XCIX.—*Estimate of the approximate shrinkages of colonial grease wools (based on an average year).*

[Prepared with special reference to the lighter-conditioned wools suitable for the American market under existing conditions.]

Description according to quality (counts).	Geelong (Port Phillip).	Riverina (Port Phillip).	Sydney (New South Wales).	Queensland.	Adelaide (South Australia).	South Australia, south-eastern district including Portland Bay.	West Australia.	New Zealand.
Merino.	*Per cent.*	*Per cent.*	*Per cent.*	*Per cent.*	*Per cent.*	*Per cent.*	*Per cent.*	*Per cent.*
70s-80s, clothing	47-49	.....	50-52	52-54	.....	48-50	.....	55-58
70s	46-48	50-52	52-54	50-52	54-56	49-51	50-52	52-54
64s-70s	45-47	46-48	46-48	47-49	53-55	48-50	48-50	52-54
64s, warp	44-45	45-46	50-52	46-48	53-55	48-50	51-53	50-52
64s, combing	45-47	46-48	47-49	48-50	52-54	48-50	51-53	52-54
60s	46-48	48-50	50-52	50-52	52-54	46-48	50-52	52-55
58s	44-46	46-48	.....	.....	50-52	.....	.....	.....
Crossbred.								
60s comeback	38-40	40-42	(1)	(1)	(1)	40-42	(1)	40-42
58s	37-38	39-40	(1)	(1)	(1)	39-40	(1)	38-40
56s, ½ blood	37-38	39-40	(1)	(1)	(1)	39-40	(1)	33-36
50s, ½ blood	35-36	36-37	(1)	(1)	(1)	36-37	(1)	32-35
46s, ½ blood	31-32	33-34	(1)	(1)	(1)	33-34	(1)	28-31
40s-44s, low ½	28-30	30-32	(1)	(1)	(1)	30-32	(1)	29-32
36s-40s	25-26	27-28	(1)	(1)	(1)	26-28	(1)	.....

[1] Quantity small.

CAPE OF GOOD HOPE AND NATAL.

	Per cent.
Oakendon, 10 months	54–56
Mossel bay, 10 months	54–56
Karoo 70's, 12 months	58–60
Kaffrarian.	
Farmers, 12 months	53–55
Farmers, 6 months	55–57
Natal	55–57
Orange River Colony, average combing	60–62

FORM A DUTY SHOULD TAKE, IF LEVIED.

The chief defect to be remedied (aside from the matter of classification considered above), if a duty should be imposed, is this inequality arising from the fact of the varying degrees of shrinkage of wools. One method proposed for doing away with the inequality is to impose an ad valorem duty. It is held by some persons that the desirability of the different kinds of wool, from the standpoint of shrinkage and other factors, is reflected in the price, and that such a duty would therefore remove the discrimination. The difficulty of administering an ad valorem duty is a very serious objection.[20] Wool is not a standardized commodity. It is evident from what has been said earlier in this chapter that practically every lot of wool has peculiar characteristics of its own, and the judgment of experts in regard to the value of each bale would vary appreciably. Furthermore, the methods of marketing wool in different parts of the world are very unlike, so that a value established in one market is hardly comparable with that established in other markets for a supposedly similar grade of wool.

Even if it were not for this difficulty of administration, however, there is another objection which might be final. When prices increase an ad valorem duty keeps pace with them, while a specific duty becomes, in effect, a lower duty. When prices fall the converse of the proposition holds good. Domestic producers usually need protection more urgently when prices are falling, and the specific duty is better for them at such a time.

A specific grease pound rate graduated according to estimated shrinkage has been proposed. It would be necessary, if such a system were adopted, to divide wool into classes according to its shrinkage and to levy a small duty on the heavy shrinking wool and a progressively greater duty on classes of wool which have a lighter shrinkage. To adjust the duty so that it would vary closely with the scoured content of the wool would require a large number of shrinkage classes, and with more finely specified classes a greater number of disputes over shrinkage are to be expected. The adoption of only a few shrinkage classes would make it easier to administer the law,

[20] Tariff Board Report on Schedule K, p. 394.

"It is well within the range of probability that under an ad valorem duty points of shipment could be so selected and the blending of grades might be so adjusted as effectually to conceal the market value of particular lots of wool."

but would adjust the duty to the scoured content in only a roughly approximate manner.[21] The adjustment of the proper compensatory duty would be made difficult by resort to such a scheme.

A better method than either of these, to obviate the difficulties of the old system of duties, would be to levy a specific duty on the scoured content of the wool. To do so would eliminate former discrimination in favor of light shrinking and against heavy shrinking wools and thus do away with one of the chief criticisms of the old method. It would also eliminate the former discrimination against domestic producers entailed by the importation, on a grease basis, of "skirted" wools from which the bellies and higher shrinking parts had been removed. The task of scouring a sample of each lot of wool would not be formidable.[22]

Objection may be made to a flat, specific duty on the scoured content of wool, on the ground that such a duty bears more heavily upon the cheaper, coarser wools than upon the finer and more expensive. Such a result is inevitable when a flat, specific rate is levied upon a product, the different grades of which vary in value. In the case of wool this is particularly true at the present time, when world conditions, already discussed in this report, have forced the price of coarser wools to abnormally low levels. Since this is necessarily

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[21] A possible modification of this method was mentioned by the Tariff Board (Vol. I, p. 395). This was to fix a maximum rate of shrinkage at a point which would include the greater part of the wool imported. This would probably be about 55 per cent shrinkage. Then several classes of shrinkage could be established for the heavier conditioned wool, with a smaller specific rate of duty for each class of heavier shrinkage. It could be determined without great administrative difficulty that a certain lot of wool either was or was not within the range of shrinkage provided for the first-mentioned class. It would have to be decided by an actual test just where a certain lot would fall if it came "near the line," and the classification of the heavier sorts, for which smaller duties were provided, would also have to be decided by test. The amount of wool which would actually have to be scoured in the course of administering such a law would, however, be comparatively small.

The illustrative classification presented by the Board (p. 395) was as follows:

	Cents per grease pound.
Wools shrinking not over 55 per cent	11
Wools shrinking over 55 per cent but not over 60 per cent	9½
Wools shrinking over 60 per cent but not over 65 per cent	8½
Wools shrinking over 65 per cent	7½

It was estimated that between 160,000,000 and 170,000,000 pounds of the 200,000,000 pounds which was imported annually, on the average, at that time (1911) would be entered under the classification for low-shrinking wool. Only about 10 per cent of the remainder would have to be tested in order to establish the shrinkage rates.

[22] "The Tariff Board has carefully investigated this matter and with the aid of the Bureau of Standards has reached the conclusion that it is not only possible but it is relatively a simple matter to test wool by sample at the time of importation. It has also ascertained that the machinery required for scouring and conditioning wool in small lots is inexpensive and could be promptly installed and the cost of operation would be light. If Congress should deem it wise to adopt this method of collecting duties upon raw wool it would seem that the details necessary for its prompt, efficient, and economical administration may safely be left to the proper administrative officers of the Government." (Report on Schedule K, p. 397.)

a temporary condition, the examination of the effect of a specific scoured-pound duty should be based on prewar prices in order to obtain a fair basis for comparing the effect of such a duty on wools of varying shrinkages and values. Wool is purchased on the basis of its scoured content. The value of scoured wool determines the price of wool in the grease. The significant thing, therefore, in any discussion of a specific scoured-pound duty is its effect on the scoured price of the different grades of wool.

For the purpose of contrasting the effect of a specific scoured-pound duty versus a specific grease-pound duty, Table C is presented.

TABLE C.—*Ad valorem equivalent of specific duty on grease and scoured basis.*

FOREIGN WOOLS IN THE BOSTON MARKET.

Type of wool.	Shrinkage.	Yield.	Oct.-Dec. Average prewar price, 1909-1913.		Scoured pound equivalent of 15-cent grease duty.	Scoured pound duty at 45 cents.	Ad valorem equivalent of specific duty.	
			Grease.	Scoured			15 cents per grease pound.[1]	45 cents per scoured pound.[1]
1	2	3	4	5	6	7	8	9
	P. ct.	*P. ct.*	*Cents.*	*Cents.*				
Australian 70s	47	53	43.9	82.8	28.3	45	34.2	54.4
Australian 64s	46	54	42.3	78.4	27.8	45	35.5	57.4
Australian 60s	48	52	39.1	75.1	28.8	45	38.3	59.9
N. Z. XBred, 56s	37	63	41.3	65.5	23.8	45	36.3	68.7
N. Z. XBred, 46s/48s	32	68	37.9	55.7	22.1	45	39.7	80.8
Arg. XBred, Lincoln	27	73	31.1	42.6	20.6	45	48.4	105.7
Arg. XBred, straight quarter-blood	35	65	33.2	51.1	23.1	45	45.2	88.1
Arg. XBred, high quarter-blood	38	62	34.5	55.6	24.2	45	43.5	80.9
Montevideo, half-blood	46	54	35.9	66.5	27.8	45	41.8	67.7
Montevideo, three-eighths blood	40	60	34.2	57.0	25.0	45	44.0	79.0
Cape of Good Hope, choice	64	36	34.7	96.3	41.7	45	43.3	46.7
Cape of Good Hope, average	66	34	31.6	92.9	44.1	45	44.6	48.4

[1] Rate in emergency tariff bill.

This table shows the average shrinkage and average yield of clean fiber for standard foreign wools sold in the Boston market. These wools were probably all "skirted," and the prices given in the table are higher because of the 11-cent duty in force at the time. Column 6 shows the scoured-pound duty equivalent to a 15-cent specific duty levied on wool in the grease which may be compared with a 45-cent scoured-pound specific duty as shown in Column 7. Column 8 shows the ad valorem equivalent of a 15-cent specific grease-pound duty levied on the prewar scoured value, that is, it indicates in percentages the amount the prewar scoured value would be raised by the assumed specific duty on the grease pound. Column 9 presents the similar effect of a 45-cent scoured-pound specific duty.

For the purpose of comparison, Table CI, which follows, presents similar duty for a selected range of domestic wools.

TABLE CI.—*Ad valorem equivalent of specific duty on grease and scoured basis.*

DOMESTIC WOOL.

Type of wool.	Shrinkage, per cent.	Yield, per cent.	Average prewar price[1] 1909–1915.		Scoured pounds equivalent of 15-cent grease duty.	Scoured pounds duty at 45 cents.	Ad valorem equivalent of specific duty on prewar clean value.	
			Grease.	Scoured.			15 cents per grease pound.[2]	45 cents per scoured pound.[2]
			Cents.	*Cents.*				
Fine delaine (Ohio)	61	39	27.5	70.5	38.5	45	54.6	63.8
Fine (Ohio)	65	35	23.5	67.1	42.9	45	63.9	67.1
Half-blood	58	42	29.7	70.8	35.7	45	50.4	63.6
Three-eighths-blood	50	50	29.7	59.5	30.0	45	50.4	75.6
Quarter-blood	45	55	29.1	53.2	27.3	45	51.3	84.6
Fine Territory Staple	65	35	22.0	64.5	42.9	45	66.5	69.8
Fine Territory Clothing	67	33	19.2	58.8	45.5	45	77.4	76.5
Medium Staple	60	40	23.7	59.5	37.5	45	63.0	75.6
Medium Clothing	62	38	20.0	52.8	39.5	45	74.8	85.2

[1] Approximate. [2] Rate in emergency tariff bill.

It might be desirable, however, to modify the method of basing the duty on the scoured content somewhat by having a specific duty levied by a sort of step-rate, according to the shrinkage, as described above. One class of wool could be made out of what used to comprise Class I and Class II under the act of 1909. This would embrace all wool suitable for making clothing. Class I included "all wool bearing any trace of Merino blood," immediate or remote,[28] and Class II included most "English wools." As indicated previously, it would seem that necessity for distinguishing these two classes has disappeared. Another class might be created out of what formerly was Class III, "carpet wools."

In levying the duty on "wools suitable for making clothing," cognizance might be taken in the following manner of the wide difference in quality of wools. All wool capable of being spun into 60s or finer counts of yarn could be made subject to one duty. Wool of a coarser type could be made subject to another and lower rate of duty. This does not provide for a carefully graduated scale of duties, but it does establish two classes which could be ascertained fairly easily. Only a small proportion of the wool imported would be "on the border line," and the administrative difficulty would consequently not be great.

Standard samples could be used in classifying the importations. A more complicated system of duties, graded according to spinning counts, would more nearly approach to abstract justice, but would be difficult to administer. The "60s top" represents a very large "line," and this grade fairly marks the dividing line between "medium" and "fine" wools.

[28] Such blood imparts a character which is unmistakable.

It might be preferable, however, if a line of demarcation were drawn, to levy one duty on all wool of 50s quality and lower, and a higher duty on wool above 50s in grade. Such a division would more nearly remove the heavier incidence of a flat scoured-pound duty on the coarser, lighter shrinkage wools, as 50s fiber corresponds to domestic three-eighths blood on the low side. Of course, it would not be entirely fair to levy the same rate on the low grade—e. g., 36s—wool as on the medium—50s—or the same rate on the 60s as on the 80s, but it might be better to do this than to ignore all differences in quality.[24] Another way to accomplish this result would be to levy an ad valorem rate on the scoured content of the wool. This, however, would create grave difficulties in the administration and in the adjustment of the compensatory duty.

The tariff act of 1909 levied different specific rates on carpet wool, according to the value. It is not necessary to comment upon the difficulty with undervaluation under such a system. It would not be feasible to classify this wool according to spinning counts, and as a number of inequalities would be done away with by using a flat rate on the scoured content, it would seem better not to make the duty any more complicated. Any duty on mohair, alpaca, and vicuna fibers should be levied in the same manner.

[24] An alternative plan is to establish standards for "fine," "medium," and "coarse" wool and to have a higher duty on fine than on medium and on medium than on coarse wool. The Bureau of Markets, U. S. Department of Agriculture has issued samples of tentative wool grades of this character.

APPENDIX.

PUBLIC CONFERENCES WITH THE UNITED STATES TARIFF COMMISSION ON THE WOOL-GROWING INDUSTRY IN THE UNITED STATES.

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PUBLIC CONFERENCES WITH THE UNITED STATES TARIFF COMMISSION ON THE WOOL-GROWING INDUSTRY IN THE UNITED STATES.

INTRODUCTORY NOTE.

In this appendix is given verbatim the most important portions of the information gathered by the Tariff Commission in its public conferences held on the wool-growing industry at Albuquerque, N. Mex.; Flagstaff, Ariz.; Salt Lake City, Utah; Boise, Idaho; Rawlins, Wyo.; Columbus, Ohio; Chicago, Ill. These conferences were open to the public and all interested were invited to attend and submit any data which they might desire. The Commission takes no responsibility for any of the statements made at these conferences. The Commission believes, however, that the parties interested in an industry are entitled to state their case, and in these conferences, as in others which the Commission has held the information given has been of great assistance to the Commission and has formed a practical foundation upon which it could prepare its reports.

CONFERENCE AT ALBUQUERQUE, N. MEX., OCTOBER 18, 1919.

STATEMENT OF MR. PRAGER MILLER, PECOS VALLEY WOOL GROWERS' ASSOCIATION, ROSWELL, N. MEX.

Commissioner CULBERTSON. Mr. Miller, where do you live?

Mr. MILLER. In the Pecos Valley of southeastern New Mexico. I might state here the reasons for the present high cost of production in my locality. The range situation has become such that the overhead expenses in running our flocks are enormous. The question naturally arises: Can we reduce the cost of producing wool by eliminating any of these expenses? I think we can not. because the country is gradually being taken up and consequently it looks as though the price of land would rise unless some condition arises to retard that development.

Commissioner CULBERTSON. The uncertain factor in the situation in your locality is the land question, is it?

Mr. MILLER. That is the biggest problem facing the wool growers.

Commissioner CULBERTSON. Has the 640-acre homestead act had anything to do with the situation?

Mr. MILLER. The 640-acre homestead act has not had any effect in my district, because the homesteads generally have not been designated, and perhaps never will be. If they should be, it would cramp us badly.

Commissioner CULBERTSON. Land in your locality is Government land?

Mr. MILLER. Mostly that; we have purchased and leased some land from the State.

Commissioner CULBERTSON. When did you start in the wool business, Mr. Miller, and how large an outfit did you have?

Mr. MILLER. In the year 1907 I was engaged in business with my father and we had 20,000 head of sheep, principally Rambouillets.

Commissioner CULBERTSON. Have you changed the breed in any appreciable extent since that time?

Mr. MILLER. Yes, sir; we have bred Delaines with Rambouillets, producing what we term "Rambouillet-Delaine" sheep.

Commissioner CULBERTSON. What was the reason for putting that type in?

Mr. MILLER. For the reason that the range to lamb on is so uncertain that we naturally depend on our wool clip. If we preserve our grown sheep we always have our wool, whereas we are never certain of a lamb crop.

Commissioner CULBERTSON. Did the Delaine increase the weight of your fleece and the quality of the wool?

Mr. MILLER. It did both, and the Rambouillet strain produced a larger sheep.

Commissioner CULBERTSON. Did the coming of free wool in 1913 affect your policy toward your flocks?

Mr. MILLER. I anticipated breeding more for mutton, but, with the demand for wool, resulting from the World War, we naturally obtained larger prices than we anticipated, and, for that reason, we are still breeding for wool.

Commissioner CULBERTSON. Was there not a general tendency in your locality in 1913, as a result of free wool, to turn to mutton breeds?

Mr. MILLER. Yes, sir; and not only that, a good many men sold out, anticipating lower prices.

Commissioner CULBERTSON. That tendency was arrested by the breaking out of the war?

Mr. MILLER. Yes, sir; because the war increased the price.

Commissioner CULBERTSON. If free wool continues and international trading is restored, will there again be a tendency in your locality toward mutton breeds?

Mr. MILLER. If the importation of foreign wools into this country is allowed unconditionally and without limit, there certainly will be a tendency to go back to mutton breeds.

Commissioner CULBERTSON. If you go back to mutton breeds, will it cost more to run them than the type you run now?

Mr. MILLER. That would depend entirely upon the lambing crop. If we decreased our wool and then failed in lambing, we would be in a worse condition than ever. It costs us more to run these sheep per year.

Commissioner CULBERTSON. Will you describe the type of management followed—running of the flocks, water supply, methods of breeding, and the conditions surrounding the sheep industry in your locality?

Mr. MILLER. Sheep are generally run in camps of from two to three bands—1,000 to 1,200 sheep to a band—with a wagon, a sheep boss, a cook, and a herder for each band, who stays with his flock day and night. To get to good feeding on a real sheep range we have to forage 40 or 50 miles. We freight our provisions, salt, feed, and other commodities at a cost to-day of 75 cents a hundred.

All the springs in my locality were taken up by homesteaders several years ago, so we have gone into undeveloped country and sunk wells, some as deep as 1,200 feet. These wells, big cement tanks, and pumping plants necessitate a great deal of expense.

Commissioner CULBERTSON. Does that eliminate the small grower?

Mr. MILLER. There are very few small growers in my part of the country, because they can not stand the overhead expense.

Commissioner CULBERTSON. Do sheep live on the range the year round in your country or do you have to ship to other points?

Mr. MILLER. They live on the range except during a drought. During the last drought there were thousands of sheep shipped out to graze in other parts of the country.

Commissioner CULBERTSON. What have you done in the way of grading wool?

Mr. MILLER. We have so many different grades of wool in our flocks it would be unwise to grade it without scouring, and we have no scouring plant.

Commissioner CULBERTSON. Are there any scouring plants in New Mexico?

Mr. MILLER. Yes; at Albuquerque.

Commissioner CULBERTSON. Have you considered the question of skirting the wool, as they do in Australia?

Mr. MILLER. We have considered it, but it does not pay. Several of us took out the tailings and skirts, but we didn't get any more for our wool than we did before. The buyers wouldn't consider it. They have asked us to pack it as we have always done.

Commissioner CULBERTSON. Do you sell wool on consignment to eastern concerns?

Mr. MILLER. Nearly all of the wool in my locality for the last 10 years has been concentrated in the Bond-Baker warehouses, from which it is sold on commission. They hold regular auction sales and sell to the highest bidder. These sales have been very successful.

Commissioner CULBERTSON. You spoke of the range situation as being the most uncertain factor in your part of the country. Have you any suggestions as to how that situation might be relieved?

Mr. MILLER. State control would be my first answer to that question. However, I do not think that is a popular solution of it. I would rather see the remaining public domain under Government control, as the national forests are, as I believe it would be more popular with stockmen than State ownership, but not with taxpayers. The foremost problem in increasing production is the range problem, and when that is solved it will give stability to the industry.

Commissioner CULBERTSON. In what way would that increase production? Are not the ranges grazed to their maximum?

Mr. MILLER. I believe not. Where you control your range you can run more sheep per section and with greater success.

Commissioner CULBERTSON. Would that solution be agreeable to the cattlemen as well as the sheepmen?

Mr. MILLER. I think so.

STATEMENT OF MR. WILLIAM R. MORLEY, OF DATIL, N. MEX.

Mr. MORLEY. The use of the forest reserves has been of inestimable value to me, but I am convinced that the remaining public domain should be turned over to the State in which it lies. I favor each State leasing land to the stockmen, as against the permit system of the Forest Service. In that way the lands would produce a direct revenue to the State, whereas the Federal Government is now receiving the bulk of the revenue. Forty-two per cent of the area of New Mexico is Government land and nontaxable, so the live-stock industry of the State pays over half of the taxes. It has to bear the expenses for the entire area of the State, including this 42 per cent, which in justice to the other taxpaying property of the State, should bear its equitable burden.

Under the permit system I am told that I can run so many sheep per acre. This whole system is governed by a series of regulations and limitations which conflict with the practical stockman's experience. Various officials and rangers send him information and decide on the carrying capacity of his range. The stockmen conform to the regulations of the forest reserve, and, in a majority of cases, profit from the fact that the forest reserve prevents predatory stock from eating out their ranges.

Commissioner CULBERTSON. You would leave the forest reserves under the control of the Federal Government and simply lease the right to graze that land?

Mr. MORLEY. I would let the existing forests alone, but I believe in some cases the grazing phase might be handled better by stockmen. The questions arise of destruction of plant life, timber, and reforestation, where conflict might arise over the matter of grazing, but you will not run sheep and cattle over a reforestation area and destroy the young growth, and in that way you will conserve the timber supply.

On the remaining public domain in New Mexico there is no timber and it is merely a grazing proposition. The Government exercises no supervision until some one applies for a homestead, and then they pass on his application. Of the public domain, 20,000,000 acres in New Mexico are unappropriated and free to anyone. The result is they are overstocking this range area in their effort to conserve that part on which they have protection.

Commissioner CULBERTSON. What is the best way to use these 20,000,000 acres of unappropriated public domain to get maximum production?

Mr. MORLEY. I think 99 per cent of it is useful at present for grazing purposes. Methods for farming such land may be developed later. These lands have been picked over for 300 years, first under the Spanish land grants, grants to homesteaders, forest reserves, and Indian reservations; latterly under various extensions of the homestead act. The agricultural land was picked first, so the remaining land is what has been rejected for three centuries and now is used almost entirely for grazing cattle and sheep.

Commissioner CULBERTSON. Would the passage of a homestead act giving 10 sections instead of 640 acres meet the situation?

Mr. MORLEY. There would probably be a tremendous acreage taken under such a law, but the economic result is problematical. It would cut down the existing flocks in the State and give the small herd and flock owners a better chance to make a living. It takes two or three hundred head of cattle and not less than a thousand to fifteen hundred sheep, and hence considerable acreage, to maintain the average small family. Most men can not make a living on the 160 and 640 acre homesteads, and this has been a detriment to the live-stock industry in the State.

The two forces that seem to be active are those for State control and those for a permit system similar to the forest-reserve system. Leasing by the Federal Government at so much per acre has been advocated, but the effort to have an act passed by Congress failed.

Commissioner CULBERTSON. What have you to say on the profitableness of handling cattle and sheep together?

Mr. MORLEY. If you control the land, you have no difficulty in grazing both sheep and cattle without either suffering. There are many varieties of plant life which the sheep do not eat and which the cattle do eat, and vice versa. The proportion of two sheep to each cow on the range is about right, and they can be intelligently grazed in that proportion, but if you overstock with sheep they tramp out and ruin the cattle range as well.

STATEMENT OF MR. M. N. MIKESELL, VICE PRESIDENT AND GENERAL MANAGER FARMERS' DEVELOPMENT CO., SPRINGER, N. MEX.

Mr. MIKESELL. Our problems are not the same as those in the southern part of the State. I am only familiar with conditions in Union and Colfax Counties, in northeastern New Mexico. The public land there that had not already been homesteaded was segregated and taken up by the State and leased to stockmen.

They were just beginning to feel secure of their range when the State began to sell the land, and within the past five years practically all of it has been sold to small holders. The larger stockmen have practically been put out of business, so far as the use of the public domain is concerned, except where they have seen fit to buy State lands at the public auctions.

Commissioner CULBERTSON. Is it then a problem of breeding smaller flocks?

Mr. MIKESELL. It is a problem of owning—absolutely controlling—all the land on which you graze. There is practically no open domain.

Commissioner CULBERTSON. How large a flock do you run?

Mr. MIKESELL. We are now reduced to about 10,000 sheep as against 30,000 head five years ago. We did use considerable Government land which was rough but well grassed, but in the last five years the State land has been sold and the remaining Government land homesteaded. We are now running as many of our sheep as we can on the range we control.

Commissioner CULBERTSON. Will this process of driving the sheep raiser out continue until he is entirely eliminated?

Mr. MIKESELL. A large percentage of homesteaders are buying a few cattle and no sheep. The number of sheep in our locality is probably less than 10 per cent of what it was eight years ago.

Commissioner CULBERTSON. Is there likely to be any further decrease?

Mr. MIKESELL. Probably not, as the sheep ranging business is more or less incidental. The Government grants in our locality are almost entirely used for cattle. We are the only ones in Colfax County that are running sheep to any extent on the grants. We have considerable irrigated land adjacent that we use for pasture in winter. There we have a considerable amount of deeded land and State leased land. This State land lies in the timber in the mountains, and we use that for summer ground.

Commissioner CULBERTSON. You run them down in the winter and feed them on forage produced on your irrigated land?

Mr. MIKESELL. Yes, sir.

Commissioner CULBERTSON. The situation differs in that respect from the situation in the southern part of the State, where the sheep are run the year round on the range.

Mr. MIKESELL. We do not have sufficient range, so we find it necessary to winter-feed in order to stay in business. With the increase in value of sheep we have changed our methods. We do considerable winter feeding, and now lamb early in sheds during March, April, and May, whereas under range conditions the lambing was done in the northern part of the State in May.

Commissioner CULBERTSON. Have the changed conditions in latter years affected the breeds of sheep you are using?

Mr. MIKESELL. There are not many range men in the breeding business who will get very far away from the Merino types. This is because the Rambouillet sheep herd better than the coarse breeds. They are a good dual-purpose sheep, and also seem to stand up better under range conditions.

In 1913 we started a strain of Leicester in our Rambouillet herds. Now we are going back to as heavy-fleeced and large-framed Rambouillets as we can get for a good dual-purpose sheep. If one is keeping the ewe lambs and buying in considerable numbers when ewes are cheap, the tendency is to breed that way.

Commissioner CULBERTSON. What per cent of your income comes from wool and what from mutton?

Mr. MIKESELL. Close to half and half. There is a much more stable demand for mutton in recent years than formerly. There was a time when practically the only profit from sheep was in wool.

Commissioner CULBERTSON. You have not attempted the Australian skirting system in your business?

Mr. MIKESELL. We have followed the practice of the country and put the wool up as the buyers wanted it. We did not care to pioneer in the matter.

Commissioner CULBERTSON. Do you feel that a tariff on wool is a necessity, taking a flock like your own from which you obtain an income from both mutton and wool?

Mr. MIKESELL. I have nothing upon which to base a judgment, because conditions have been so peculiar during the time we have had free wool. It will be impossible for us to continue operations unless the present price on wool is maintained. If that depends upon a tariff, then a tariff is certainly necessary.

Our labor costs in 1917 amounted to 58 cents per head as compared to $1.02 per head in 1918, with other costs in proportion.

In the Northwest large numbers of ewes are now being sacrificed on the market by growers who have been in the habit of feeding through the winter, because they can not afford to do so on the present basis of prices. That would be our situation if we did not depend partially on the range. Our margin is not very wide as it is, but by early lambing and shedding we get a better percentage of lambs and larger ones.

Our land is on too high a basis to be owned for grazing. There is a considerable amount of dry farming which has been meeting with a measure of success. The tendency is to combine cattle grazing and farming. The smaller holders of land are not going into the sheep business, so there is a tendency toward an increase in the number of cattle and a decrease in the number of sheep.

Commissioner CULBERTSON. In what markets do you sell lambs?

Mr. MIKESELL. They are generally sold direct to the Colorado feeders, or are shipped to either Kansas City or Denver to be sold to feeders.

Commissioner CULBERTSON. These lambs have to go through another stage before they reach the consumer?

Mr. MIKESELL. Yes, sir. They have to be fattened. You will see that in our case State ownership has worked a hardship on the sheep industry, because State lands have been sold at a price which we couldn't afford to pay for the purpose of running sheep on them.

Mr. MORLEY. What are the purchasers of those lands using them for?

Mr. MIKESELL. As a rule, they are farming a portion and grazing a considerably greater portion with cattle.

Mr. MILLER. These small holders are going in for cattle instead of sheep, because they can not keep sufficient sheep to justify hiring a herder to take proper care of them.

Mr. MIKESELL. That is true. They can not run sheep under fence, because of the danger from coyotes and dogs. A few of them have attempted the share basis and failed.

Mr. HUBBELL. How do you arrive at the relative income from wool and mutton?

Mr. MIKESELL. With us it is simply a question of actual figures. We charge to every department of our business its fair share of expenses, but do not attempt to definitely segregate the profits. If we have a profit on sheep, we do not attempt to show how much of that profit comes from wool and how much from lambs; but in gross sales, taking one year with another, it amounts to nearly the same amount. If the lamb crop happens to be short, the wool crop is more or less static. In such a year the sales from wool will greatly exceed the sale from lambs. If the lamb crop is good and prices good, then lamb production would be in excess.

Mr. HUBBELL. In the past 10 years could you profitably raise sheep in this country on land at an average price of $3 per acre?

Mr. MIKESELL. Land in our part of the State is $5 an acre; but I believe our grazing lands yield much more than the lands in this part of the State. I would say on the present basis of prices we could do it, but in every part of the State, on a valuation of $5 an acre, it means a fixed carrying charge of 40 cents an acre. We can not possibly, in our part of the State, pay 40 cents per acre on land and graze it with either sheep or cattle. The only way we can afford to own land is to control the adjacent land on a low basis. We can not stay in business and actually own every acre that we use if we depend upon the income. We figure the lands have a certain speculative value, which encourages ownership.

Mr. HUBBELL. Do you think it would be better to turn the remaining public domain over to the States to be handled under the present system, or more profitable to have it handled by the Federal Government under the system used by the Forest Service?

Mr. MIKESELL. I think it would be more desirable for the State to own the land and get the revenue, provided the State will give the stockman some assurance of his tenure on a reasonable rental basis. But if there is no assurance that the State will do that I think by all odds that the land should remain in the hands of the Government to be leased.

Mr. HUBBELL. What does it cost to run an ewe in the State of New Mexico?

Mr. MIKESELL. At Miami we do considerable feeding and early lambing and. in 1918, it cost us $6.85 a head, while in Union County, where we use the range almost exclusively, it cost $3.19. Those figures cover such charges as directly concern the sheep and a fair proportion of our overhead.

Mr. MORLEY. Do your losses show in that report? Did you charge up the sheep that died to operating expenses?

Mr. MIKESELL. No; just the actual expense of running, without regard to loss or profit.

Mr. MORLEY. And not including interest?

Mr. MIKESELL. Actual expenditures, including interest on investment. They are not carried on our books at present values but at cost values, which are considerably less.

STATEMENT OF MR. FRANK A. HUBBELL, REPRESENTING THE FRANK A. HUBBELL CO., ALBUQUERQUE, N. MEX.

Mr. HUBBELL. Mr. Commissioner, the big question agitated in the Western States is, "Under what method should the remaining public domain be handled?" Of the lands left in Arizona and New Mexico, I should say that from 95 to 98 per cent of them are only fit for grazing purposes.

The homestead policy is a detriment to the State and Government, and it is a crime to allow real estate men and representatives of the bureaus of immigration of the different States to go into the Eastern States and tell the people that there is a lot of public domain in New Mexico and Arizona, and that on 640 acres they can make a fine living.

Many homesteaders are taking up land in ignorance of weather and other conditions in the country. I believe that 90 per cent of the people who finally prove up on the lands are helped by stockmen who live near by and who wish to conserve their ranges, as this is probably a cheaper way than buying it from the State or securing it in any other way.

Most of the people would like to see these lands under State control, because would help the tax returns of the State. You can figure that no stockman

who has been buying average land in the State of New Mexico for from $3 to $5 an acre can successfully operate his sheep and cattle without losing money. The stockmen know that whenever the State gets control and the rental is not limited to from 3 to 5 cents per acre, that he is doomed to financial ruin. Under the forest-reserve system you can make a little money.

I believe that the Government can better handle the situation than the State. If the State is given unrestricted control of the lands, the stockmen will be competing with each other to control the range and never will make any money. Ninety per cent of them would be bankrupt within less than 15 years.

I am in favor of more liberal restrictions and limitations than we have under the present forest-reserve system. I think the Government should turn back some of the revenue to the State after paying the actual administrative expenses; that such revenue should be used for building roads, maintaining schools, etc.

Mr. MIKESELL. I would like to explain a little further the land condition in my part of the State.

State lands have practically all been sold at prices ranging from $5 to $20 an acre, probably an average of about $10. Their productive value, which depends upon the success of the dry farmers, or perhaps upon striking oil, has not yet been determined. There is speculation going on in these lands now.

Mr. MORLEY. There are approximately 13,000,000 acres of State lands in New Mexico. At 5 cents an acre those 13,000,000 acres will produce a revenue of $650,000 per annum to the State. As a matter of fact, the revenue to the State from this land is in excess of a million dollars annually.

There are approximately 8,000,000 acres of forest-reserve land which, under the permit system, produce, roughly speaking, 2½ cents an acre for the Federal Government. Approximately 35 per cent of that is returned to the State to be expended for schools, roads, or other specific purposes, or about eight-tenths of 1 per cent per acre comes back from the Forest Service.

The State applied a high valuation to these lands because of the impoverished condition of the State treasury, and partially because the forest-reserve lands and the unappropriated public domain were not bearing their fair share of expense. If you make 90 per cent of this land tax free, you have to tax the other 10 per cent enough to pay the State and Government expense. That is the condition which seems to me has been responsible for the high prices which our legislature has fixed on these State lands.

We must have revenue. We can not get it from the forest reserve or from the unappropriated public domain, so these excess valuations were made in order to make up a deficit caused by Government control of the unappropriated public domain. The State would have placed a more reasonable value on these lands, both for sale and for leasing, if the stockmen and forest reserve had been heard on the matter. I believe under the present valuation the stockmen will be driven out of business.

I believe that the best development of citizenship comes from the State controlling its entire resources. The man who is actually in the business, with his life and money tied up in it, is the best judge of the value of the grazing land, and can use it more intelligently than it can be used under bureau direction.

Mr. HUBBELL. In figuring 13,000,000 acres at 5 cents an acre, from which the State would derive a revenue of $650,000 to help pay expenses, you did not include cost of surveys, etc., and there probably would be only about one-half of that money which would go to the State.

Commissioner CULBERTSON. I would like to get this discussion centered on the specific problem of the Tariff Commission, namely, which one of these reason-

tive land policies is likely to result in the lowest cost of production of wool. Mr. Hubbell, in your opinion, if the lands were turned over to the State on the same basis that they are handled now, what proportion of the sheepmen would be driven out in 10 years?

Mr. HUBBELL. There would not be 10 per cent of the sheepmen left in the country.

I have been in the sheep business 35 years. If the public domain goes into the hands of the State, I am going into the cattle business or sell out—no more sheep business for me. If the Government is going to look after the needs of the Nation with respect to raising wool, mutton, and beef, the land should be under the control of the Federal Government.

Mr. MILLER. I infer you could make more money from steers, on land purchased from the Government, than you could from sheep?

Mr. HUBBELL. Yes, sir.

Mr. MILLER. Then, under present conditions, the cowman in New Mexico will average more money from his cattle than he will from sheep, on the same land, under the same conditions, under fence?

Mr. HUBBELL. Yes, sir. The cowman that can absolutely control his range and keep his cattle under fence with equal management in both lines of business can make more money. The open-range cattleman can not make an average of 5 per cent on his money throughout the State. For the sheepman the open range is the best thing.

Mr. MILLER. I asked that question because in the eastern part of New Mexico, where it is all under fence, cowmen state that if they knew how to handle sheep they would put all sheep into pastures, because it is more profitable.

Mr. MORLEY. I should like to ask Mr. Hubbell if the price he is paying for land is a vital reason why he can't make as much money with sheep as he can with steers?

Mr. HUBBELL. No, sir. The reasons are the expense of running sheep within that area compared with the revenue which you derive; conditions of the country, such as altitude, etc., and the fact that you have ranges on which you can not keep your sheep all winter. In that section of the country you can keep cattle on those ranges.

Mr. MORLEY. The section you speak of is not in the forest reserve, because under their rules you could not have it in pasture.

Mr. HUBBELL. In this leasing business the forest reserve is very unjust to the sheepman and partial to the cattleman.

Mr. MORLEY. Yet you argue to-day that for the salvation of the sheepman the lands ought to be under the forest-reserve control?

Mr. HUBBELL. It doesn't make any difference—comparing the cattle and sheep industry under the forest reserve with them under present State management. I think the forest reserve is more favorable to the sheep industry.

Commissioner CULBERTSON. To what counties in your part of the State do you refer?

Mr. MORLEY. Socorro County in the southwestern part.

Mr. MIKESELL. I wonder if we can not make this suggestion: let the Government turn the land over to the State to be leased on a long-term basis at a reasonably low rate, controlled by the act under which the lands are turned over to the State.

Mr. MORLEY. I, and a good many other men in the State, have land rights under three systems of control—State lands, forest-reserve lands, and private leases. I refer especially to railroad lands.

Commissioner CULBERTSON. Which one results in the lowest cost of production?

Mr. HUBBELL. The forest reserve.

Commissioner CULBERTSON. Which in your case, Mr. Morley?

Mr. MORLEY. The railroad lands. I have had a perpetual lease for 14 years. There is another type—private land grants. There is a large area in New Mexico of private land grants, and that is the most satisfactory method of grazing in the State.

Commissioner CULBERTSON. Of those four methods, Mr. Mikesell, which do you find results in the lowest cost of production of wool and mutton?

Mr. MIKESELL. I would say if we had been able to hold our State lands on the basis of 5 cents per acre that would have been by all odds the most desirable.

Commissioner CULBERTSON. Mr. Thomas, which one of these four methods of land control do you think results in the lowest cost of production?

Mr. THOMAS. We have only had private land grants.

Commissioner CULBERTSON. Will you answer that question, Mr. Miller?

Mr. MILLER. Private ownership is the real solution of the problem, because the country is going to be taken anyway. Under private ownership you can so manage your business that it will become more stable and can increase the production of wool and lambs and make it more economical.

Mr. MIKESELL. How would you acquire private ownership of present Government land?

Mr. MILLER. Either lease it or buy it from the State. Of course we all understand that we have to pay too much for it. We are assuming that the producer will be taken care of; that we will be permitted to make a legitimate profit, and that this country will not be flooded with cheaper wools which will force the price down to where we can not produce it. If we are not correct in our assumption the public is going to suffer. The point is, we do not produce enough for our own consumption, and we must do everything possible to increase production for the benefit of the public, at the same time maintaining the stability of the industry.

Mr. MIKESELL. In the sheep industry we must have secure tenure of reasonably large bodies of land with a comparatively low charge per acre or we can not continue in the sheep breeding business in this country.

CONFERENCE AT FLAGSTAFF, ARIZ., OCTOBER 21, 1919.

STATEMENT OF MR. M. I. POWERS, FLAGSTAFF, ARIZ.

Mr. POWERS. My home ranch is in the mountains—what we call a forest reserve and mountain ranch. I run about 5,000 Merinos.

Commissioner CULBERTSON. Do you winter on the mountains or go south?

Mr. POWERS. I go south into the Maricopa desert country from November to May, inclusive. Lambing takes place here in February.

Commissioner CULBERTSON. Would you rather do business under the costs and prices of 1910 than 1918?

Mr. POWERS. Under the costs and prices of 1910.

We are dependent upon climatic conditions for ranging our sheep. While economic conditions might have been good in 1910, the range conditions may have been bad as in 1917. We not only had to buy an enormous amount of feed, but lost an enormous number of sheep.

Commissioner CULBERTSON. Is the woolgrower in his present position relatively as well off as he was from 1910 to 1912?

Mr. POWERS. I would rather do business under prewar years' conditions, 1910 to 1914, other conditions being the same. Since then there has been diffi-

culty in getting and keeping labor, besides its cost and the cost of food products have increased as rapidly as the income from wool and lambs. All our outfits furnish subsistence to their men.

Commissioner CULBERTSON. Is there any tendency here to shift to mutton breeds?

Mr. POWERS. Several types have been tried the last few years, because we wanted the better prices of the earlier markets. I tried it but went back to the wool breeds. Taking range and herding conditions into consideration, we did not gain anything.

Commissioner CULBERTSON. To what extent since 1910 have grazing lands been taken over for agricultural use?

Mr. POWERS. In the last six or seven years on my range, which comprises 50 or 60 sections in the Coconino Forest, there have been 25 to 30 homestead entries made. Whether they will be successful or not, time will prove. In 1919, we had the heaviest rainfall in 22 years, so their crops will probably be profitable; but as there is practically no water in an average year it is uncertain whether they can make a living or not. On these 25 homesteads there are only two wells in an old river bed. All the water is handled from these two wells, a distance of 5 to 10 miles.

Commissioner CULBERTSON. Has dry farming been overexploited?

Mr. POWERS. No. It is in its infancy. They can raise only grain and potatoes and probably some beans.

Commissioner CULBERTSON. How have these homesteads affected the grazing industry?

Mr. POWERS. It has restricted grazing even in the forest reserves. If they could make a success of farming, I believe they would be entitled to the range over a stock proposition. On some of these homesteads on my range, where they have no crops this year, the weeds have grown up and destroyed the native grasses. They will hold them and probably sell to some stockman.

Commissioner CULBERTSON. Is the greater percentage of the lands around here adapted only for grazing?

Mr. POWERS. Yes, sir. The ranches are mostly in the small tracts or open parks.

Commissioner CULBERTSON. What management of public lands would be most satisfactory?

Mr. POWERS. Some form of leasing under Government control similar to the forest-reserve system with modifications of some of the rules governing and controlling it.

I would favor some sort of a blanket permit for the winter range, because at certain seasons the desert has good grasses; for instance, the alfilaria, which grows anywhere from six weeks to two months. Cattle can not use this range, but sheep, especially during lambing, can graze on green alfilaria for a month or more without water.

Some years there is no feed in the desert, and we go back into the foothills, so we would have to buy an enormous amount of land to be protected in the different climatic years. I favor some blanket system of leasing or permit that would apply to the summer range as well as the winter.

Commissioner CULBERTSON. To what extent is there borrowing by the sheepmen?

Mr. POWERS. The sheepmen are usually heavy borrowers.

Commissioner CULBERTSON. What of the speculative element in the sheep business and its hazards?

Mr. POWERS. The running of range sheep is one of the most speculative businesses in the world. We have no lambing facilities. Where we lamb depends upon feeding conditions. We can not raise enough forage in this country to take care of winter feeding, but have to buy in the Salt River Valley at prohibitive prices.

Commissioner CULBERTSON. Do some growers winter in this section?

Mr. POWERS. Some do on Anderson Mesa and at Cataract Canyon, where they can drive the sheep to lower altitudes.

Heavy storms are likewise disastrous because of lack of feed and lamb losses. One season it rained every day for nine days and practically every lamb dropped in those nine days, especially at night, was lost. For that reason, we need exceptionally good years to offset the bad. The sheepman ought to make 20 to 25 per cent on his investment in a good year in order to offset bad seasons. In 1917 losses were so enormous and feed so high that it came very close to being a disastrous year for a great many. We paid $90 for corn and had to haul and freight it.

Commissioner CULBERTSON. Do you think that the sheep industry in this locality is likely to become more and more an adjunct to general and diversified ranching or part of a general business including cattle raising and agriculture?

Mr. POWERS. No; on account of water conditions. This is not a farming country in the sense of the Middle West farms. It will either continue as it is or be superseded by agriculture.

Commissioner CULBERTSON. The sheep business is likely to remain an independent and distinct business in this State?

Mr. POWERS. It will either remain or vanish.

Commissioner CULBERTSON. Admitting the numerous difficulties, to what extent would a tariff help?

Mr. POWERS. A tariff would undoubtedly stabilize the price of wool and encourage production.

We might be unduly apprehensive as to the price of wool after war conditions cease, but if it follows the history of free tariff legislation on wool, it will be a rather hard question as to how long we can stay in business. Several people contemplated selling out in 1913 after the coming of free wool, but war conditions came on very soon.

Commissioner CULBERTSON. With the restoration of normal conditions in international trade, will that tendency be renewed under free wool as we have it to-day?

Mr. POWERS. I think the tendency would be renewed, as far as the mental attitude is concerned. International relations and their bearing upon the price of wool is a large question, upon which I think we, as practical sheepmen, are not so well advised.

STATEMENT OF MR. H. I. GRAY, WOOL GROWER, BELLEMONT, ARIZ.

Commissioner CULBERTSON. Where is your home, Mr. Gray?

Mr. GRAY. I live on a ranch, south of Bellemont.

Commissioner CULBERTSON. How many sheep do you run?

Mr. GRAY. About 3,200 breeding Merino ewes.

Commissioner CULBERTSON. Do you breed chiefly for wool or mutton?

Mr. GRAY. It is about 50-50. We figure that a 7½-pound wool clip from each ewe will take care of the running expenses.

Commissioner CULBERTSON. You summer on the Coconino Forest, and go south to the Maricopa Desert?

Mr. GRAY. Yes, sir. I have a permit on the Prescott National Forest for 2,000 breeding ewes.

Commissioner CULBERTSON. Do you have any serious difficulty?

Mr. GRAY. It is not a cinch to be able to find feed down there.

We have a blanket reserve permit for 22,000 head of breeding ewes on the same reserve, which we use in community fashion with 10 other bands, grazing over the entire reserve at will and not being confined to any particular section, as we are up here.

In 1918 we had to buy feed. There are a great many browses in that southern country that, with the grass forage, will carry the ewes up to lambing time. If we do not get the usual rainfall in January, we must buy cotton seed and corn; and hay from the farmers in the Salt River Valley at $30 a ton; pasture at from $7.50 up per acre; and green feed at $1.25, or whatever they charge us.

Commissioner CULBERTSON. On your summer range about how many acres does your flock graze over?

Mr. GRAY. My permit on the Coconino covers about 24 sections of very much broken up country, with felled timber and browses and fairly well-distributed springs, natural tanks and some tanks that we constructed.

Commissioner CULBERTSON. Is tank construction a large item?

Mr. GRAY. Not under my own permit; but under many it is. Mr. Hugh Campbell has many thousands of dollars invested in tanks.

Mr. HUGH CAMPBELL. The cost depends entirely upon the locality and the capacity of the tank. We have tanks that cost from $500 to $15,000 and one dam possibly more than $15,000.

Commissioner CULBERTSON. How is your investment protected on a national forest?

Mr. HUGH CAMPBELL. The forest-reserve people protect us. They give us the privilege of the domain adjacent to the tank or dam.

Commissioner CULBERTSON. If you go out of business, can you recover the value of the tank or lease it?

Mr. HUGH CAMPBELL. We could on our own patented land, but on Government land it would depend how the supervisors felt.

Mr. POWERS. I believe these water rights in the national forests can be assigned.

Mr. MILLER. Ordinarily the permits authorizing the construction of these dams provide that they shall become the property of the United States if built since this became a national forest.

Mr. POWERS. I would like to have it go into the record that there is practically no living water for the stock business except a few springs.

Mr. HUGH CAMPBELL. At least 70 per cent of the stock on the Coconino National Forest is entirely dependent upon artificially-conserved water.

Commissioner CULBERTSON. The conditions in Mr. Gray's case are exceptional.

Mr. HUGH CAMPBELL. Absolutely; yes, sir.

Commissioner CULBERTSON. Does the porosity of land make tank construction difficult?

Mr. HUGH CAMPBELL. The ground after several years becomes stamped down by the stock coming after water, so that they finally hold water.

Commissioner CULBERTSON. Mr. Gray, how many men are required to run your 3,200 ewes?

Mr. GRAY. Owing to having 1,200 head over a full band, it costs me a little more. I have two men with the 1,200, the same as if I had 2,000.

Commissioner CULBERTSON. What equipment have these men in the field?

Mr. GRAY. Anywhere from 5 to 10 burros, costing us formerly $5, now $25, and camp equipment. They have pack saddles, boxes, a tent, and cooking utensils. We furnish provisions.

Commissioner CULBERTSON. What type of labor is used here?

Mr. GRAY. For two or three years I have used Spanish labor, and we find it most satisfactory; though we pay them less wages, in the long run they make part of it back.

Commissioner CULBERTSON. Do you buy your equipment at wholesale, and how do you get it out to the men?

Mr. GRAY. They give us a little lower rate, but not wholesale. We haul the supplies in automobile trucks or wagons. It is almost impossible to run a business without an automobile truck these days.

Commissioner CULBERTSON. When your flocks move south, do they traverse well-defined highways through the forest?

Mr. GRAY. Yes, sir. We take the Bear Head Driveway and another, and have a certain time to cover the distance. The same herders take them south that have carried them on the ranges in the north, except in the fall, when we send a camp man with each. You double your force when you start south.

Commissioner CULBERTSON. You maintain the same force in the south until the lambing season?

Mr. GRAY. Yes, sir. Then my outfit puts on from four to eight extra men, generally eight, for about two months.

Commissioner CULBERTSON. The same class of labor?

Mr. GRAY. The same wages, but not the same type. The scarcity of labor is such that we simply take the best men we can find, and these are often absolutely worthless, which means another trip to town, from 50 to 75 miles in automobile trucks.

Commissioner CULBERTSON. What percentage of your lambs do you save?

Mr. GRAY. In 1918 we reached home with 49 per cent, in 1919 with about 91 per cent. The sheepmen in Arizona figure if they can average 75 per cent of lambs they have done mighty well.

Commissioner CULBERTSON. I notice in the 1912 report of the old Tariff Board a case is cited in northern Arizona in which a company controlling 18,000 sheep "marked up" 18,000 lambs for a year. That is very exceptional, is it not? (Vol. 2, p. 599, Report of Tariff Board.)

Mr. GRAY. Yes, indeed, it is.

Mr. HUGH CAMPBELL. That never happened.

Mr. GRAY. Here is a feature that maybe was not considered. I do not presume they figured certain losses in old stock at all, and made good in lambs. If you lose 3,000 out of 18,000 ewes, you must replace them before you can figure your profits.

Commissioner CULBERTSON. Would not you get a larger percentage of lambs from a mutton strain? Does not a Hampshire ewe sometimes have two or three lambs?

Mr. HUGH CAMPBELL. You may have more twins from a Rambouillet ewe than a Merino; but if you take a Merino, a Lincoln, or a Shropshire herd for three consecutive years, the Rambouillet herd will drop more lambs that will be alive at the end of six months than any other, and they are so much better and easier to handle.

Commissioner CULBERTSON. Would you rather do business at the costs and prices of to-day than of 1910?

Mr. GRAY. I can not see any difference. When you get to the end of the year you are about the same place you were.

Commissioner CULBERTSON. Is the organization of the grazing lands here satisfactory to the sheepmen?

Mr. GRAY. The forest reserves are, but the open range is not, due to the way they are divided. Under the way they are handled at Phoenix anybody can put in an application for a section and get it, whether they are stock people or not. That is, under the Arizona law. Some sections of land were given to the State under the enabling act. That land is leased to anybody who applies for it—stockmen, outsiders, and homesteaders.

Commissioner CULBERTSON. Could a man combine cattle and sheep raising on the same range and get a better result? What is your opinion, Mr. Campbell?

Mr. HUGH CAMPBELL. He might with winter and summer range, but he certainly could not if he had to move his cattle from 175 to 200 miles for winter range, as he does his sheep.

Mr. GEORGE CAMPBELL. The cattle and the sheep business are two different propositions here on these mountains. To run cattle with any success one must have a winter range in the vicinity of his summer range, as cattle can not be driven to the desert. The ranges are about taken up, and the only way for a new man to get in is to buy from some one who is thus established.

Commissioner CULBERTSON. Have you something of that kind on your range, Mr. Woolfolk?

Mr. WOOLFOLK. Yes; although I don't own any cattle, both cattle and sheep are run on the same range. I hope in the near future we will be able to remedy that.

Commissioner CULBERTSON. How do you market your wool, Mr. Gray?

Mr. GRAY. I consign to Boston wool brokers, as I think most of the members of the Arizona association do.

Commissioner CULBERTSON. Have there been any cooperative wool sales?

Mr. GRAY. Not like those up North.

Commissioner CULBERTSON. Where do you ship your lambs?

Mr. GRAY. For eight or nine years I have been selling here on the range, the lambs going to Los Angeles. Some are sold in Denver and St. Joseph and a great many in Kansas City.

Commissioner CULBERTSON. Do you sell for feed or immediate slaughter?

Mr. GRAY. For immediate slaughter. I imagine about 50 per cent of lambs generally are sold for immediate slaughter.

Mr. HUGH CAMPBELL. It would be fully that much.

Commissioner CULBERTSON. Do the Salt River Valley irrigated ranches handle sheep?

Mr. GRAY. They handle a few old ewes. Generally, with but two or three exceptions in the entire State, they are handled by the sheep men themselves. They purchase feed from the ranches.

Mr. WOOLFOLK. Taking a period of 8 or 10 years, after making your old stock good, what do you figure the average lamb percentage to be?

Mr. GRAY. I think I averaged 70 per cent.

Mr. WOOLFOLK. We can only get at the increase by taking a period of time. For 21 years my average percentage was about 65 per cent, but after making the old stock good over that period, 65 per cent is high.

Commissioner CULBERTSON. Have you made allowances for replacements?

Mr. GRAY. No; I am just giving the average lambing. If I were going to make my stock good, I would make it 60 per cent. Lambing has decreased in the last four years, owing to congested conditions on the ranges.

Commissioner CULBERTSON. After you have maintained your flock at 3,200, taking account of your losses, how many lambs would you have to sell?

Mr. GRAY. Not over 50 per cent. I would consider 1,600 lambs a good yearly average.

Mr. HUGH CAMPBELL. I think that is just about right.

Mr. GRAY. My own personal loss in 1918 was something like 13 to 14 per cent of my old stock, and being in small bands should have had the best of it.

Mr. POWERS. Most men count their lambs when they put the earmarks on, but the proper time is at the end of the year when you have made your losses good.

Mr. GRAY. The question was asked: "Which would be worth more to you, 8 cents more per pound for your wool clip, or 2 cents per pound increase (average increase) in the price of market lambs?"

In answer to that I would rather have the 2 cents on the lamb. My own flock produces about 7¾ pounds, which is a little above the average. Eight times that would be 62. At 2 cents a pound average for a lamb weighing 70 pounds you can figure it out for yourself.

Commissioner CULBERTSON. Which would you rather have, Mr. Campbell?

Mr. HUGH CAMPBELL. If you only raise a few lambs, 8 cents on the wool is best.

Mr. GRAY. In the long run, it wouldn't make much difference, although $2 a hundred difference on lambs is a lot of money sometimes.

Commissioner CULBERTSON. Do you hand shear or machine shear?

Mr. GRAY. Machine shear.

Commissioner CULBERTSON. In the south, on the Maricopa?

Mr. GRAY. Sometimes it is a little bit higher up than the Maricopa Desert.

Commissioner CULBERTSON. What kind of labor have you for shearing, and what are the charges per hundred sheep?

Mr. GRAY. We have the unionized sheep shearers who travel all over the United States. It is simply a holdup now. They have raised the price in the last six years from 7 cents a head to 21½ cents.

Mr. JOHNS. They held me up last year on one bunch for 28 cents just because we could not get the hand shearers.

Commissioner CULBERTSON. Do you find, Mr. Woolfolk, that hand shearing is more satisfactory than machine shearing?

Mr. WOOLFOLK. Yes; but we are an exception. Lately hand shearers have been hard to get, so we use Mexicans and find more satisfactory and cheaper than fighting with union labor. Mr. Yeager and I shear together, but we have to travel some distance after the necessary 12 or 14 men.

Mr. GRAY. Down below we all have to shear at a certain time so we can start back home, and consequently the shearers take advantage of us.

Commissioner CULBERTSON. Have any of you put in your own machines?

Mr. GRAY. Quite a few men have machines of their own.

Commissioner CULBERTSON. Do you hire your men by the day to operate your machines?

Mr. HUGH CAMPBELL. We have a man in charge who hires the men.

Commissioner CULBERTSON. How much is the regular Government rate on the summer range in the forest reserve?

Mr. GRAY. Fifteen cents for six months.

Mr. MILLER. Our rates are figured at 25 cents for the year, which is one-fourth of the rate on cattle. For the shorter seasons you take one-tenth of the annual rate and multiply it by the number of months the sheep graze. We have several different seasons—some five months, some six months, and some seven months. The average rate for summer range is around 15 or 16 cents. The rate prescribed for the winter range varies too. Nearly all begin in November and end April 30 or May 31, depending on the range. With the increased fees here, winter rates are approximately the same as the summer rates.

Mr. GRAY. It costs me more than 25 cents the year round. The rate on the winter range is about 19 cents.

Commissioner CULBERTSON. Is it also on a Government reserve?

Mr. GRAY. Part of my outfit is; yes, sir. I think the northern sheepmen have permits down below for something like 60,000.

Commissioner CULBERTSON. How much equipment do you need for dipping 3,200 sheep?

Mr. GRAY. The dipping vat stands the two of us $750. This year it cost me over $120 to dip.

STATEMENT OF MR. P. J. MORAN, OFFICE MANAGER BABBITT BROS., FLAGSTAFF, ARIZ.

Commissioner CULBERTSON. I believe you can give us information on the type of sheep and the condition of the wool-growing industry among the Navajo Indians.

Mr. MORAN. They run the Navajo sheep, which are a coarse-wool sheep, and I do not think they figure on introducing the Merino strain.

Commissioner CULBERTSON. Have the Indians developed the water supply?

Mr. MORAN. No; they seem to move their bands whenever they need water.

Commissioner CULBERTSON. Around the watering places are the ranges overstocked?

Mr. MORAN. Yes; at certain times of the year in some locations.

Commissioner CULBERTSON. Do they use all their wool for the making of blankets, or sell some?

Mr. MORAN. They sell most of it. It is sent to wool brokers in Boston the same way the Merino is handled. We buy a good deal of it through our trading posts on the reservation. In past years we sent one or two carloads to Philadelphia. All the rest of ours has gone to Boston in the last five years. We have shipped only three cars of Navajo wool this year as against six or seven cars in former years.

Commissioner CULBERTSON. Does that wool compete with your wool, Mr. Campbell?

Mr. HUGH CAMPBELL. It does not compete; no.

Commissioner CULBERTSON. What is the relative price of the two wools?

Mr. MORAN. Not over two-thirds, possibly less. Navajo wools are worth about 32 cents now to the grower, but have been as high as 40 cents earlier in the year.

Commissioner CULBERTSON. Does your company purchase wools and ship them East?

Mr. MORAN. Navajo wools only. They handle other wools for the companies in which they are interested.

Commissioner CULBERTSON. Was the uncertain element in the sheep business largely climatic in 1917 and in 1918?

Mr. MORAN. Altogether. That is about the only condition here that makes or unmakes the sheepman.

Commissioner CULBERTSON. Suppose the sheep industry goes out of existence, what effect would it have upon northern Arizona?

Mr. MORAN. None, other than it would take time to restock the ranges.

Commissioner CULBERTSON. What of those ranges with no water, where cattle could not exist?

Mr. MORAN. I think that condition obtains more in the southern ranges than in northern Arizona, where both sheep and cattle range over the same country. Possibly water could be developed in Painted Desert, Dead Mans Flats, and up

through that country. I am not familiar enough with ranges to know. There are no cattle or sheep on a large proportion of the area north of the mountains.

Mr. GRAY. If the sheep industry was taken out of Arizona, would it mean a considerable decrease in the Babbitt interests?

Mr. MORAN. There is no question about that.

Mr. HUGH CAMPBELL. There is just one physical condition which can not be overcome, and that is climatic. There is summer grazing in these mountains for just the present number of stock. If you remove the sheep you can not run the cattle, because you have no winter range adjacent.

Mr. WOOLFOLK. The winter ranges to-day are fully stocked. At least 200,000 head of sheep run through the summer in this country and go to these southern ranges in winter.

STATEMENT OF MR. A. A. JOHNS, AUBREY INVESTMENT CO., PRESCOTT, ARIZ.

Mr. JOHNS. The questions and answers here to-day imply that the interests and prosperity of the sheep business have no reflex influence on the community. In my opinion the condition of the sheep industry has the greatest influence on the prosperity not only of northern Arizona but the whole State, because a great deal of the money accruing from the industry goes for feed into the Salt River Valley and the Maricopa country.

I live west of Seligman. Our range is partly in Mohave and Yavapai Counties, with some few sections outside of the forest reserve in Coconino County. We own the railroad land on the range.

Commissioner CULBERTSON. Do you run your sheep the year round on these ranges?

Mr. JOHNS. No; we go south into the Sacramento Valley, west of Kingman. We run about 10,000 ewes of Rambouillet stock. We take south, depending on the season, two or three bands. Sometimes we take them all, shear, and bring them right back, lambing one or two bands on the mountains.

Commissioner CULBERTSON. Is the difference between your summer and winter ranges similar to that here on the Coconino Forest and the Maricopa Desert?

Mr. JOHNS. With the exception that we only trail 45 to 50 miles on railroad land, partly owned. It is becoming more difficult to trail in that part of the country. There are some cattle raisers in between the summer and winter ranges and a few homesteaders.

Commissioner CULBERTSON. Do you find that a combination of cattle and sheep results satisfactorily?

Mr. JOHNS. Yes, sir. We have several hundred cattle.

Commissioner CULBERTSON. Would you rather do business under the costs and prices of 1910 than of to-day?

Mr. JOHNS. We had a much lower investment in 1910. Railroad lands could not be bought then; but now, in our part of the State, practically every other section of the railroad lands is owned. We graze over the even sections owned by the Government. We pay a minimum price of 8 cents an acre for leasing State lands, which goes to the school funds.

Commissioner CULBERTSON. What do you pay for railroad lands?

Mr. JOHNS. The first lands were sold at 90 cents an acre. Then the price was raised to $1. For some we have paid $2.50. There is no irrigation in that part of the State and no living water, so we have to build dams and reservoirs.

Commissioner CULBERTSON. Are your flock management, equipment, and labor conditions similar to that described by Mr. Gray?

Mr. JOHNS. Yes; just the same.

Mr. POWERS. Your conditions are different in this respect; you do not have to trail over long distances and are not troubled with homesteaders.

Mr. JOHNS. We have not the same desert problem, because we also lease railroad lands in the desert.

Mr. PERKINS. You do not have to stand a 10 per cent loss coming and going?

Mr. JOHNS. I believe that 50 per cent lambing after our flocks are maintained comes nearer. I do not think there is any outfit in the western part of the State doing any better than that.

Commissioner CULBERTSON. Are these railroad leases secure?

Mr. JOHNS. They are yearly leases, with the exception of those down in the desert. The New Mexico & Arizona Railroad Co. are five-year leases, but the Santa Fe leases are all one year and not renewable except at the option of the railroad company.

Commissioner CULBERTSON. Would you prefer that the public domain be placed under a system similar to the forest reserve or controlled by the State in the same way as at present?

Mr. JOHNS. I think State control is developing very satisfactorily in the western part of the State.

Commissioner CULBERTSON. Which is the most satisfactory to you, Mr. Campbell?

Mr. HUGH CAMPBELL. I prefer that the public domain be controlled absolutely by the Federal Government, under conditions similar to those existing in the forest reserve.

(Mr. Powers, Mr. Gray, Mr. Piper, and Mr. Brown agreed with Mr. Campbell, but Mr. Woolfolk qualified it by suggesting independent classification of these lands by the Federal Government.)

Mr. JOHNS. Under the enabling act the odd-numbered sections belong to the State. There are only a few sections in each township that could be placed under Government control. For instance, the sixteenth and thirty-sixth are school sections. Under the enabling act, four out of the 36 are given to the State. Eighteen even-numbered sections are already owned by the stock men. This leaves only 14 sections in each township that could be placed under Federal control. No system devised could cure that situation.

Mr. POWERS (interrupting). That only applies to one little 40-mile strip in which the railroads are interested.

Mr. JOHNS. Forty miles on each side of the railroad, and then a little strip of 10 miles on each side of that, comprising all the better sections of grazing land in the northern part, a strip about 50 miles wide clear across the State.

Commissioner CULBERSON. Outside of that strip, is there a large amount of public land controlled by the Federal Government?

Mr. JOHNS. Well, the southern part of the State.

Mr. HUGH CAMPBELL. You do not classify these deserts as grazing lands?

Mr. JOHNS. No. I can not understand the position of these gentlemen who want Federal control.

Mr. HUGH CAMPBELL. There are 22,000,000 acres of unappropriated lands in the State, outside of forest reserves and Indian reservations.

Mr. WOOLFOLK. And of State lands granted by the United States Government, ten or eleven millions, all told.

Mr. JOHNS. I believe there were 7,000,000 acres under the original enabling act.

Mr. WOOLFOLK. I talked the matter over with the State treasurer last winter, and he figured out something over 10,000,000 acres of school, university, and other lands in the State.

Mr. JOHNS (interrupting). It has increased a good deal. However, I believe that there is very little grazing land or land suitable for farming in the State, but what you will discover is either Indian reservation, forest reserve, railroad grants, or privately owned—very little worth anything.

Mr. GRAY. And private leases also?

Mr. JOHNS. You can not lease those lands unless they are selected.

Mr. HUGH CAMPBELL. That is the reason we would want the Government to take hold of it; so we can lease it.

STATEMENT OF MR. F. E. POLLOCK, FLAGSTAFF, ARIZ.

Commissioner CULBERTSON. Is the sheep industry on a stronger financial basis now than it was in 1910?

Mr. POLLOCK. No; I do not think it is. In this locality the sheepmen are in very good shape, but the drop which I expect in the next couple of years is liable to absorb all the profits.

Commissioner CULBERTSON. Is there considerable money loaned to sheepmen in this locality?

Mr. POLLOCK. Not as much as in 1910.

Commissioner CULBERTSON. Would you rather do business on the costs and prices of 1910 than of the present?

Mr. POLLOCK. Yes, sir. The abnormal expenses are not offset by present prices. There is more clear money in running low-priced sheep at low expense, than in running high-priced sheep at abnormally high expenses, and very much less financial risk. Ewes at the present price are a very highly speculative investment. I don't see how we can hope to eliminate that element from the business until sheep strike a lower level and our expenses are much reduced.

Commissioner CULBERTSON. What is your opinion on the land question?

Mr. POLLOCK. We have been compelled to invest millions in railroad lands on account of the Santa Fe owning the alternate sections for 40 miles on either side of the track. The grave question is how are we to protect the investment made. The governor has advanced the opinion that where men had been compelled to make purchases to protect their range, they should be allowed to cut these alternate sections down and consolidate in a single block. An exchange of sections would require some special act, in order to allow a man with 100,000 acres to consolidate and turn back to the State the other solid body.

Commissioner CULBERTSON. Is your chief business that of banker?

Mr. POLLOCK. Yes; but I have been in the cattle and sheep business for 25 years.

STATEMENT OF MR. E. G. MILLER, SUPERVISOR COCONINO FOREST, FLAGSTAFF, ARIZ.

Commissioner CULBERTSON. Mr. Miller, will you describe the system of forest-reserve control?

Mr. MILLER. Our system varies according to the type of allotments. One allotment carries from ten to twenty-eight thousand sheep. On the Prescott Forest there are some 60,000 head of sheep from November 1 to April 30 or May 15. Instead of individual allotments, as on the summer ranges on the Coconino Forest, we have a system of blanket allotments, which are not altogether a success. Our cattle do not graze within restricted areas like sheep, but have much larger ranges. They drift up during the spring and down again before the snow falls. The cattle ranges overlap the sheep ranges, though we have some areas

on all the forests from which the sheep are excluded. In the Coconino Forest this is mostly on the Verde watershed, because the Reclamation Service considers that sheep cause more damage there than cattle. These forest areas from which sheep are excluded during the latter part of the winter are used by cattle, and, since they are fully stocked and the bulk of the forage utilized, we would not gain a great deal by mixing cattle and sheep.

On the higher summer ranges we prefer individual sheep allotments, as it prevents so much milling around. The sheepmen get along better with one another, and we have less trouble in handling. The statement that if sheep were taken out of the country we could replace them with cattle and still fully utilize the range is very erroneous, as many of our forage plants are not suitable to cattle. The bulk of weeds are relished by sheep, whereas fully half of them are not eaten by cattle and upon half of the other 50 per cent cattle could not thrive. On our higher mountain ranges sheep will also consume the bunch grasses during the spring when they are tender, and the bunch grass seed in the fall, but they don't like the coarse stems. Cattle will eat the coarser forage and not injure to a great extent what is relished by sheep.

Commissioner CULBERTSON. Will you name some of the grasses and browses on the summer range?

Mr. MILLER. At this altitude the coarse pine bunch grasses do not vary a great deal. We have the beardless bunch grass, a five-bunch grass, and the Mountain Muhlenbergia. Growing with these grasses are a number of browses, such as Gambel's oak, the Apache plume, sometimes called black brush, and skunk brush or sour bitter.

In certain localities we have two or three varieties of sages, of which the white sage is one of the best. In the foothills is the mountain mahogany, live oak, and two or three varieties of ceanothus, a valuable browse for both sheep and cattle. The sheep will live on the live oak, although it is not fattening. Down toward the desert we have the mesquite grass. It is one of the chief desert grasses in fall, prior to the coming of the alfilaria, the Indian wheat, and the poppies. I believe the alfilaria is the most valuable feed we have in the desert, although no good during lambing.

Commissioner CULBERTSON. What are some of the chief poisonous plants?

Mr. MILLER. On the higher summer ranges we have the rattlepod loco and the white loco. At the present time we are sending down a new variety of loco to the Bureau of Plant Industry for experimental purposes. They are going to feed it to both cattle and sheep to find out the effect on the two classes of stock. Larkspur, while deadly to cattle, can be safely eaten by sheep in some localities. Each spring, when there is a shortage of feed, we have some live-oak poisoning. If the animal is fed plenty of salt, we usually do not experience any difficulty, and are not as much troubled as the cowmen.

Commmissioner CULBERTSON. What are the Government charges on the forest reserve?

Mr. MILLER. For cattle $1 per head per year, for sheep one-fourth of that, for hogs three-fourths, and for horses 25 per cent more. For the shorter seasons you take one-tenth of the annual rate and multiply by the number of months, adding a 2-cent fee for lambing on the forest. We have no "year-long" sheep at the present time on the Coconino Forest. The season, April 15 to November 30, costs 18½ cents and May 1 to October 31, 15 cents. The seasons vary in the different forests. On the Prescott Forest most of the sheep are grazed in winter. Sheepmen on the Coconino plateau are absolutely dependent on some lower range for winter, and so the bulk of the sheep are taken to the desert. About 60,000 head of them go to Prescott Forest, where they graze

from November 1 to April 30 or May 15. It is vital to the industry in northern Arizona that these winter ranges be kept open, for unless some other system of management is worked out sheep will have to go. With the present cost of hay, corn, and cottonseed cake, we feel it is vital that the desert lands be kept open from the 1st of December until late in the spring.

Commissioner CULBERTSON. Will you describe the movement of sheep southward? What months are they on the summer range?

Mr. MILLER. Ordinarily they enter the driveways down on the Prescott Forest from the 20th of April to the 20th of May. They arrive on the summer ranges from the 20th of May until the middle of June and stay until late in the fall. A few bands are on the mud tanks trail at the present time, and two or three bands are just ready to start down from the Bearhead trail.

Commissioner CULBERTSON. In addition, what other trails are there leading south from the Coconino Forest?

Mr. MILLER. There are three across the Coconino Forest and five across the Prescott Forest. These trails mean the concentration of the sheep on the desert within a comparatively small area. Fencing of many sections on the edge of the desert is going to block many of the outfits. I have seen conditions so acute there that the whole country was grazed off as barren as this floor.

Commissioner CULBERTSON. How long are the flocks kept in the foothills?

Mr. MILLER. It varies according to the season. Some 20,000 sheep graze on this northern Arizona Forest, and 60,000 go on the Prescott, where they stay all winter. If there is an alfilaria crop on the desert they will probably go out during the lambing season, around the 15th to the last of January, returning to the forest between the 15th of February and the last of March. Sheep that are entirely dependent upon the desert and foothill ranges outside of the lower forests usually stick in the foothills during December and January. A year ago last winter, due to lack of summer rainfall, feed in these hills was very short. As a consequence, the sheep were poor at lambing time, and many of them slipped their wool. There were big losses in both wool and lambs. Last winter the feed on the foothills was fair. We had good rains late in the fall and there were places on the desert with good feed in January and excellent in February and March.

Commissioner CULBERTSON. What prevents cooperation between the summer and winter range?

Mr. MILLER. There is no control, and naturally the local stockmen desire some protection. They get State selections if possible, which bars out sheep from that particular area unless the man getting the selection happens to be a sheepman.

Unfortunately so many of these State selections of 640-acre homesteads fall in natural passage ways that they practically block the sheep. If there was some sort of control to keep these winter ranges or lambing ranges open it would be fine. The sheep industry in Arizona is doomed unless somebody can figure out a different handling of the reserve or some way to protect these ranges. With hay at $30 a ton for ewes and corn at $90 I do not believe we can survive without these desert ranges. The loss of the sheep industry to northern Arizona would be the biggest blow I can conceive of except the entire loss of cattle, because they go hand in hand. Where a man has a straight grass range he does not necessarily need sheep. He can handle it with other classes of stock. There are certain of our higher ranges on which we can not hold cattle and other places where sheep utilize the range and go 5, 6, 7, or 10 miles for water, whereas in the rougher sections they should not go over 2 miles.

The sheep industry is vital to our existence on the forest, for fires would probably kill a big percentage of our timber in Arizona and New Mexico if the forage

plants were not eaten down. We have the best results on the bulk of our higher ranges where we class the stock together.

Commissioner CULBERTSON. The original purpose of the forest reserve was to conserve the watersheds and timber, was it not? But this later development has become important also?

Mr. MILLER. Yes, sir. In the early days we did not realize that forests had such a vital relationship to the live-stock industry. We have been working with the advisory boards of the more important live-stock associations in the West and are trying to follow the suggestions of the stockmen to a great extent. We do have to make cuts in the permits of some sheepmen to provide range for others. We may cut several of our larger permittees to provide range for two or three class A beginners. But that does not mean a decrease in the total number of sheep grazing on the forest. The same applies to cattle. If we have authorization for 80,000 head of cattle, we do not decrease their numbers in order to increase sheep. We have endeavored to keep the two industries on about the same basis year after year. This year we initiated a new system, granting the sheepmen five-year permits for a certain percentage of their holdings. We reserve a percentage of the total number of sheep allotted, because we may need to make substantial cuts during the next few years to relieve overgrazing, to provide range for class A beginners, or to relieve conditions where it is possible some damage is being done to the yellow-pine seedlings. We do not feel that it is going to be necessary to make any large cut in the number of sheep on our northern Arizona forest during the next decade. I really imagine, 20 years from now, we will be grazing approximately the same number of sheep that we are at present. Some of the sheepmen have individually been responsible for the increased carrying capacity of a great number of our ranges. They have opened up a country that heretofore had not been utilized; and where the ranges were inadequately watered the stockmen have gone ahead with water-development projects.

Commissioner CULBERTSON. What is the carrying capacity of these summer ranges?

Mr. MILLER. It depends upon the forage. Where there is a stand of yellow [illegible] will not be more than two-tenths of the surface of the ground covered with forage plants. In other places there will be as high as [illegible] stand. Ordinarily in these higher ranges we allot on the basis of [illegible] acres, and a cow to about 30 or 35 acres.

Commissioner CULBERTSON. What is the carrying capacity of the winter range?

Mr. MILLER. They vary greatly. In the alfilaria country when we have a [illegible] it is almost impossible to get enough stock to eat it before it [illegible] away. The number of stock that can be profitably handled [illegible] the number depends upon how many can be carried in the foot-[illegible] comes. There is probably no other place in the West [illegible] State is so absolutely dependent upon another part for [illegible] In New Mexico conditions are radically different. There the [illegible] has his winter range close to his summer range, and sheep on the [illegible] are permitted the year long.

Commissioner CULBERTSON. What are the wages of your herders, Mr. Camp-[illegible]?

Mr. [illegible]. From $60 to $75 a month for herders.

Mr. [illegible]. We have been paying $80 to $85, and some as high as $100.

[illegible] on their food increased but their tastes have developed. [illegible] have required milk and other extras.

CONFERENCE AT SALT LAKE CITY, UTAH, OCTOBER 23, 1919.

STATEMENT OF MR. W. D. CANDLAND, MOUNT PLEASANT, UTAH.

Mr. CANDLAND. I have about 2,500 Rambouillet thoroughbreds, and I pay 8 or 9 cents per head for 90 days for summer range in the Manti National Forest. We have two herders, one for rams and one for ewes and lambs. In winter the sheep are kept on range which I own, but most of my neighbors take theirs to the desert, which is 100 to 200 miles distant from the summer range.

Commissioner CULBERTSON. Do they trail from the summer to the winter ranges?

Mr. CANDLAND. Yes; they trail; but the lands along the trail have been so taken that there is merely a lane from the summer to the winter range. They purchase hay along the route and obtain water from the streams and springs. On the desert snow is the chief source of water supply. Some do not have water after they leave the desert trail until they come back in the spring—from about the middle of October until the middle of April.

Commissioner CULBERTSON. What type of labor do you use for both the summer and winter ranges?

Mr. CANDLAND. We use native labor, almost exclusively.

Commissioner CULBERTSON. What are the wages paid now?

Mr. CANDLAND. Last year I paid the two herders $125 and board. My camp tender in the summer is from my own family and does the riding back and forth.

Out of 1,200 head of lambs in the spring I lost 400 with goiter. That was unusual, probably due to a lack of iodine. I had fed the sheep better, too, and hired the best men I could get to take care of them, and therefore expected better results.

After we came off the reserve 25 of my choicest ram lambs died from poisoning. A few weeks later I lost 50 head of the choicest registered ewes with bloat. There was altogether a total loss of about $10,000 from unusual causes. These losses enter into the production of this stuff and help to make it a hazardous business.

Commissioner CULBERTSON. Do you not frequently lose largely from climatic conditions?

Mr. CANDLAND. Yes; sometimes we lose as high as 50 per cent on the desert. Thirty-three and one-third per cent loss is frequent on account of severe winters. But they have not occurred here recently.

Commissioner CULBERTSON. Does a late snowfall on the desert cause serious difficulty?

Mr. CANDLAND. Yes. The sheep trail sometimes a day without water and lose in flesh, and consequently die when the hard weather comes. There is a lot of loss through drought.

Commissioner CULBERTSON. Would you indicate the counties in which this desert lies?

Mr. CANDLAND. There is Iron, Millard, Washington, Juab, Tooele, Beaver, and Box Elder Counties, in the western part of the State, and in the eastern part there is Kane, Wayne, San Juan, Grand, and some in Uinta.

Mr. STEWART. Is there not a season of the year when you employ more than two herders?

Mr. CANDLAND. About 30 days. From the latter part of March until the 1st of May.

Commissioner CULBERTSON. What do you pay those men now?

Mr. CANDLAND. I pay $2.50 to $3 a day and board for just helpers.

Commissioner CULBERTSON. What were the wages in 1910 of camp tenders, herders, and helpers in lambing season?

Mr. CANDLAND. $50 to $60.

Commissioner CULBERTSON. Has there been any increase or decrease in the efficiency of the labor? Mr. McClure and Mr. Petrie claim that efficiency has dropped as much as wages have increased. Mr. Candland and Mr. Winder believe that wages have increased about 100 per cent or more, while efficiency has dropped 50 per cent.

Does it take twice as many men to attend a given number of sheep as in 1910?

Mr. PETRIE. No; but labor is incompetent, and the sheep are not handled to advantage. You do not get the number of lambs, nor do the ewes hold their condition. You are changing herders all the time, and so your sheep are not as well handled as with one competent herder throughout the summer and winter season.

Commissioner CULBERTSON. Mr. Candland, is it necessary to buy land to protect yourself on your ranges?

Mr. CANDLAND. Absolutely. I should have been run out of business if I had not bought the lands. There are very few who have ranges of their own.

Commissioner CULBERTSON. Which control is the more satisfactory to you, the forest reserves, the public lands controlled by the Federal Government, the State, or the railroad lands?

Mr. CANDLAND. I would prefer to have all land under private ownership, as this State needs the revenue. The winter ranges or deserts I should prefer under Federal control.

Commissioner CULBERTSON. Under what control are these desert lands now?

Mr. CANDLAND. They are not under any control, but are absolutely free to everybody, and the man who has large flocks can dominate to the detriment of the small owner.

Commissioner CULBERTSON. Would you rather do business on the costs and prices of 1910 than of to-day?

Mr. CANDLAND. I do not believe that I would.

Commissioner CULBERTSON. What is your opinion as to the relative amount of income from wool and from mutton?

Mr. CANDLAND. If we destroy the wool end of the industry, the industry itself will shortly go out, and the Nation will find itself, as during the war, without anything from which to make clothing.

Commissioner CULBERTSON. If the war had not come, to what extent might that tendency toward mutton breeds have gone in this country?

Mr. CANDLAND. We would have had wool at such low prices that the fine wool would have been driven out of business.

Commissioner CULBERTSON. If they had supplanted the Rambouillet and Merino flocks, as they then existed with mutton sheep, could these flocks exist under the same conditions?

Mr. CANDLAND. No; they would not make as desirable sheep for the range as the mixed breeds. They have not the flocking instinct. These men who run coarse wools know they are harder to maintain, as they stray away—require more herders and greater care.

STATEMENT OF MR. JOHN C. MACKAY, OF SALT LAKE CITY, UTAH.

Mr. MACKAY. My sheep ranch is in western Wyoming and my summer range in Utah. I have about 7,000 sheep in winter and 10,000 in summer, counting lambs. I sell my lambs and old ewes before starting to the interrange.

Commissioner CULBERTSON. What equipment have you on your summer range?

Mr. MACKAY. I have four sheep wagons, and four first-class teams which, including harness at present prices, cost about $500 per team. For six or eight years I have never paid less than $200 for horses. I have six saddle horses with outfits and six saddles. The wagons now will cost $300 each.

Commissioner CULBERTSON. How many men are required to handle your herds?

Mr. MACKAY. I generally have six in the winter. In every camp there is a herder and a camp man, and I have nine men from six weeks to two months during the lambing season.

Commissioner CULBERTSON. On what type of land do you graze your flocks in the summer?

Mr. MACKAY. In the forest. We are in the railroad belt, and the railroad sold every alternate section. I own 4,600 acres of summer range at Belleville, Utah. I have three sections additional leased from the railroad for a summer range.

I purchased land both from the railroad and the State of Utah. Altogether I have seven sections for summer ranges and nine sections for lambing ground in Wyoming. I own one-fifteenth of the Western Wyoming Land & Live Stock Co., a corporation formed for the purpose of regulating and controlling the winter ranges. They own 122,000 acres of ground and purchased about 24 sections of range ground and 16 homesteads. In addition they have leased from the railroad over 100,000 acres reserved as coal lands.

Commissioner CULBERTSON. You share those ranges with other people?

Mr. MACKAY. The winter range, we do, as otherwise we would not own enough land to do any good. The summer range and lambing ground are individual holdings.

Commissioner CULBERTSON. And you bought out some homesteads?

Mr. MACKAY. On Henry's Fork we bought 18 homesteads, cattle and all, to get rid of them.

Commissioner CULBERTSON. How far apart are your summer and winter ranges?

Mr. MACKAY. They are practically contiguous. We go probably 40 miles to my lambing ground and between 30 and 40 miles from there to our summer range. It is only 8 or 10 miles to the beginning of our winter range, but before we get down into the winter range it is over a hundred miles.

Commissioner CULBERTSON. What stock have you in your flock?

Mr. MACKAY. A cross between the Cotswold and Rambouillet. Years ago this country bred Rambouillet sheep, but wool was low and the packers did not care for Rambouillet lambs, rather preferring long-wool sheep for mutton. Wool did not pay expenses, which forced us into the Cotswold, the long-wool breed. To-day there is 2 cents a pound difference between that and the average Rambouillet-Hampshire. Cotswold sheep are harder to handle, the percentage of lambs is less, and the herders swear that you need horses for herding. I had to have six horses for six herds in winter, and one man killed a horse this spring at lambing time. I have gone back to the Rambouillet.

The best all-around range sheep is the Rambouillet and Cotswold cross. They are larger; the fleece is not quite so greasy; they are better rustlers. The trouble is to keep the proper cross.

When I breed Cotswolds for four or five years I get a strain of Cotswolds which get kinky. I go back again and tighten. If I drift to the other extreme, which takes five or six years anyway, I may have to cross back again to the Cotswold.

Commissioner CULBERTSON. Do you shear by hand or machine?

Mr. MACKAY. By machinery. I have an Australian shearing plant, and I am president of the company which manages it. It is near the railroad.

Commissioner CULBERTSON. What do you pay your herders?

Mr. MACKAY. Camp tenders get from $85 to $90 a month, and herders $100. Board for each man costs $50 a month.

Commissioner CULBERTSON. Have you tried cooperative wool sales in your section?

Mr. MACKAY. No. As a general rule we sell on the ground to the man who will give the most.

Commissioner CULBERTSON. Do you erect sheds on the ranges?

Mr. MACKAY. No; there are the hillsides and the brush. That is a ranch proposition with thoroughbreds. In Idaho, where they lamb early, they have sheds. This has been a hard season, and lambing is only from 70 to 85 per cent of normal.

My summer loss was 7 per cent. I have been in the business 40 years, and the average loss sustained by sheepmen is from 8 to 15 per cent per annum.

Commissioner CULBERTSON. Does that include losses from predatory animals, poisonous weeds, severe winters, and other unusual conditions?

Mr. MACKAY. Yes, sir. Lambing will range all the way from 40 to 80 per cent.

Mr. MCCLURE. I do not know what it is down South, Mr. Commissioner, but it is the conclusion of those who have looked up the facts that these sheepmen do not know how big their average annual loss is. I do not think that in the best year they ever had in the State of Utah but what 8 per cent of the sheep are lost from natural causes. That is a tremendous loss, but it is the best they can do.

Mr. CLEMONS. Three years ago from the 1st of March to the 1st of June out of 17,000 sheep we lost 3,000 ewes including lambs, and the loss was general all over the eastern part of Nevada.

Commissioner CULBERTSON. How many lambs did you market that year?

Mr. CLEMONS. All I had in excess of my shipment to market was about 22 per cent.

Commissioner CULBERTSON. What per cent of your income is from wool, and what per cent from lambs, Mr. Mackay?

Mr. MACKAY. Wool has not paid the expenses of running sheep for years, except last year.

They cost me, with interest on the investment, over $5 a head. This year my sheep did not shear over 7½ pounds. One of the main reasons why I went to the mutton breeds was because wool was not paying expenses. A Merino lamb at that time would not sell for as much as a cross-bred long-wool lamb, so I bred the long-wool sheep.

To-day, thte "shaggy wools," the Cotswold and Lincoln, do not feed as well. A smooth carcass sheep is wanted.

Commissioner CULBERTSON. What per cent of your gross receipts is from wool, and what per cent from lambs?

Mr. MACKAY. Last year it was about 50-50. This year my income from wool will be about 60 per cent and about 40 per cent from lambs.

Commissioner CULBERTSON. Have you sufficient control of your ranges and of conditions there to make you believe that the wool-growing industry in this section is a permanent industry?

Mr. MACKAY. So far as I and my associates are concerned, our ranges are permanent, because we own every other section of our summer ranges, practically in one block, and there is no power on God's earth except the price that can force us out. We could be forced out of business very readily if prices go down.

Commissioner CULBERTSON. In Arizona I found there was a space between the summer ranges on the Coconino Forest and the winter ranges on the Maricopa Desert, which was gradually being taken over by homesteaders or by cattlemen, so that in going from the summer to the winter ranges the sheep men were likely to be seriously interrupted. Is there any such condition in this locality?

Mr. MACKAY. Not in our section. So far as the sheepmen running in Idaho are concerned, they find it cheaper to ship their sheep through the country.

Mr. OSTLER. Would you not be put out of business if every odd section of land belonging to the Government should be given to some one?

Mr. MACKAY. It would have a materially bad effect upon us. It would cut out half of our holdings.

I am personally in favor of the Government taking charge of the ranges and operating them as the forest reserve does, because that would stop crowding and prevent nomads with no holdings from coming in.

Before we bought those ranges on Henry's Forks it was a dead-line country. The cattlemen killed the herders. Morally, we thought we were entitled to the range just outside the agricultural limits. Others saw us open that up and have eaten right into our ranges. We have $60,000 invested there, but on that account it is not worth much to us.

Commissioner CULBERTSON. Do you have natural water on your range?

Mr. MACKAY. On most of them. Part are dry, and we depend on snow in the winter.

Commissioner CULBERTSON. In a normal year, would you rather have an increase of 8 cents a pound for wool or 2 cents a pound for mutton?

Mr. MACKAY. Eight cents a pound for the wool.

Commissioner CULBERTSON. Do you think that the uncertainties of the sheep industry in this locality would be remedied by a tariff?

Mr. MACKAY. I think it will help materially. The most desirable assistance that the Government can give us is a high tariff on the scoured basis, because the Australian wool is always shipped in skirted.

Mr. MCCLURE. What did your Australian shearing plant cost you?

Mr. MACKAY. $10,000. We have 20 machines which shear practically 50,000 a year.

Mr. MCCLURE. In the report of the old Tariff Board it was intimated that if the growers put up their wool as is done in Australia that their income would be materially increased. A good many men in your section have adopted the Australian system. Does that materially increase the value of their wool?

Mr. MACKAY. That is my judgment, from the information I have.

Commissioner CULBERTSON. What do you consider your investment per head of sheep in lands, buildings, shearing plant, and flocks?

Mr. MACKAY. $10 to $11, including land, shearing plant, and range.

Commissioner CULBERTSON. Can you afford, on that investment, to continue in business at the present costs and prices?

Mr. MACKAY. I would not want to. There are times of loss in all business, but we hope that the labor situation will adjust itself and that things will return to normal with a good tariff on wool. If it was not for the hope within us, we would not do anything. With the present season's income, I would quit the sheep business.

Mr. MCCLURE. What were the losses in the winter of 1911 and 1912?

Mr. MACKAY. Some lost between 20 and 30 per cent. I lost over 20 per cent one winter, and in another I did not raise 40 per cent of the lambs. I lambed on the winter range, as I could not get to the lambing ground.

Mr. AUSTIN. During that year did not some men lose 40 to 50 per cent of their herds?

Mr. MACKAY. I believe that is true, in some localities.

STATEMENT OF MR. P. W. OLSON, OF COKEVILLE, WYO.

Mr. OLSON. I run between 9,000 and 10,000 sheep in five summer and three winter bands. I have both Lincoln and Rambouillet ewes and bucks and aim to keep the flock crossed, so it will be neither too fine nor too coarse. My summer range is in the Wyoming National Forest, in Lincoln County. They are taking a large portion of that away from us now for grazing elk. They started in to reduce us to 20,000 breeding ewes, so we took our dry sheep out and just sent up our ewes and lambs. They virtually took away the carrying capacity of 40,000 sheep, but did decide they would give us one more year. Mr. Beam, our forest supervisor, said this reduction would have to be made next year. That is one of the choicest grazing forests in the State and has plenty of natural water.

Commissioner CULBERTSON. What equipment do you use on the summer range?

Mr. OLSON. We use two separate equipments. We use range pack horses in summer. I have a string of five pack horses and saddle horses for each band. A foreman supervises all five bands.

Commissioner CULBERTSON. How much do you pay your foreman?

Mr. OLSON. I pay my foreman $150 a month and I pay the other men a hundred dollars each and their keep, which is about $35 a month per man. We pay expenses when he goes to town for supplies, and his expenses are usually pretty high.

Commissioner CULBERTSON. Where do you winter?

Mr. OLSON. We winter down on the Rock Springs lease, in Sweetwater County, Wyo. It was bought by the Rock Springs Grazing Association from the railroad company, together with a lot of State land.

Commissioner CULBERTSON. How is your share of that area allotted?

Mr. OLSON. It is not allotted. We go in and take our chances. It is quite a large territory and extends east from Green River until it joins the Rawlins leases in Carbon County. It runs on both sides of the track and we can go anywhere we please on that lease. Some years we winter mostly on the north side and other years on the south side. There are 100 shares of $15,000, entitling one to a band of about 3,000 sheep.

Commissioner CULBERTSON. How long does the lease run?

Mr. OLSON. It is indefinite. We own that. The Rock Springs Grazing Association bought these lands from the railroad company and has 20-year leases from the States.

Commissioner CULBERTSON. Wherein is the uncertain element?

Mr. OLSON. Between winter and summer we have to have lamb ranges and fall ranges. Our permits for summer really call for the time from the 15th of July to the 15th of September. The forester may let us stay on a little longer. It averages about 75 days.

We are supposed to go on the desert about the 15th of December and off about April 1. The balance of the time we skirmish around on the public domain, of course. We have our own lambing ground near Cokeville, which takes care of us for probably 60 days. We go on in the fall, and probably feed there 30 or 40 days, while we are sorting our bands for winter and cutting out our lambs for market.

Commissioner CULBERTSON. I would like to know whether this condition surrounding your business is normal or the exception?

Mr. OLSON. It is about normal. There are a few range pirates who do not own any land and slip in on to our lands, or on to the forest reserves.

Commissioner CULBERTSON. Do you put a greater emphasis on wool or on lambs?

Mr. OLSON. I think it is about 50-50.

Commissioner CULBERTSON. What percentage of lambs do you usually get per thousand ewes?

Mr. OLSON. About 70 to 75 per cent.

Commissioner CULBERTSON. About what investment have you in your shearing plant?

Mr. OLSON. $6,000. We shear from nine to ten thousand sheep of our own.

Commissioner CULBERTSON. Is there a tendency in your locality toward smaller or larger flocks?

Mr. OLSON. Smaller flocks.

Commissioner CULBERTSON. Are irrigated ranches developing the sheep business in any way?

Mr. OLSON. I own one of the largest irrigated ranches in the country and consider that as a part of the equipment. It is a place to keep our bucks and horses. Every winter there are usually a number of thin ewes on the range, which we ship home and feed.

Mr. SMITH. When you were asked about the tendency toward smaller flocks, did your reply refer to new men starting in with small flocks or to other people running smaller flocks?

Mr. OLSON. We used to run as many as 4,000 sheep in a band, which two good men could handle very nicely with less loss and smaller bands than after dry farming and grazing homesteads came in.

Mr. SMITH. If you get below a certain size band, will it be unprofitable?

Mr. OLSON. We handle between 2,500 and 3,000 with the most efficiency and success; twelve to fifteen hundred are ewes and the rest lambs.

Mr. SMITH. The Forest Service believes that if sheep were split up into bunches of 50 to a hundred and worked cooperatively it would put more life in the business, that there would be more people engaged in it, and be better for the public. Small cooperative herds have never been profitable, as they are not big enough for a special business.

Mr. OLSON. Our allotment on the forest reserve for all owners is for only 217,000 head, and whether owned by a hundred people or a thousand there is just so much range. When the forest reserve people first took hold, those who had never thought of going into the sheep business got the idea that a permit was an asset which they could hold for a little and then sell at $3 to $5 per head. Many small outfits which started up on that theory are practically gone.

Commissioner CULBERTSON. Was the year 1918 more profitable than 1919?

Mr. OLSON. No; not to me, because in 1918 we had very poor help. Most of our herders were of draft age. Help was not only hard to get but not worth anything, because they knew if I fired them to-day they could go over to my neighbor and get work. The result was they did not take any care of our property. These high prices are probably not as good, but we have had better help.

Commissioner CULBERTSON. Is cattle or sheep raising more profitable?

Mr. OLSON. I raise pure-bred short horns, and my cattle have paid more money on the investment in the last two years than my sheep.

Mr. WINDER. In regard to the price of wool and mutton, with us it would be very materially in favor of wool, because we, in Nevada, are not breeding marketable lambs like these gentlemen in the eastern part of Wyoming and Utah.

Mr. McCLURE. What was the effect of the 640-acre homestead act?

Mr. OLSON. It had a bad effect. We are in a stock country not a farming district, and practically all of the stock land with water is owned either by individuals, the State, or is in forest reserves.

When one gets a 640-acre tract it is usually with a view of getting a little easy money from the sheep men, so most of these homesteads have been located along trails between our lambing grounds and the forest reserve. It was just an easy living.

Commissioner CULBERTSON. Will 640 acres of that type support a family?

Mr. OLSON. No, sir; it will not. You can not get 640 acres of land anywhere that has water for irrigation. We are living at an altitude of from 6,200 to 10,000 feet. Farming is a joke. We raise hay and stock, but that is all.

Mr. McCLURE. Have they simply taken this land with the idea of selling it to you after they have acquired title?

Mr. OLSON. For no other purpose. In my 35 years here I have probably had two or three hundred men locate a little piece of land and try to sell it to me.

Mr. PETRIE. Have there not been 640-acre grazing homesteads without water filed on?

Mr. OLSON. Yes, sir.

Mr. PETRIE. Is it possible to maintain live stock there?

Mr. OLSON. No, sir.

Commissioner CULBERTSON. I was under the impression that the Land Office would not grant homesteads under those conditions.

Mr. OLSON. They grant it to anybody.

Mr. McCLURE. We put a provision in the law under which the Land Office is not allowed to designate land on which a family could not make a living.

Mr. OLSON, in an endeavor to maintain a half-blood flock does not the sheepman ultimately run out of ewes?

Mr. OLSON. That is a big problem. I have not bought very many, but have managed to maintain a good bunch of breeding ewes by careful grading. We all know how to produce them in the first place, but we can not hold the type. The Government has spent a lot of money at the experimental farms in Wyoming and Idaho, but so far has not been successful.

Mr. ROBISON. Could you give us an illustration of the average loss?

Mr. OLSON. Our average losses for about three months between leaving the shearing grounds until returning to the fall range, and cutting out our market sheep, is at least 10 per cent. Our average annual loss is from 15 to 20 per cent. During the winter of 1917 in my district our loss was from 30 to 35 per cent. Two or three times I have been put out of business entirely. You can not figure just what your winter losses will be.

Commissioner CULBERTSON. Are these losses likely to become less?

Mr. OLSON. We are spending money every year for corn and cottonseed cake and in making provision for these bad periods. Whether our losses will decrease in the future depends on the winters. Frequently our feed is 50 miles away.

Every big outfit protects itself with a warehouse on the winter range. We have a few men with 50 sheep apiece, and it is hard to get those fellows together to buy a few carloads of grain and hay at the present high prices. The men who are in the business to-day are in permanently and are spending a lot of money

for feed. The small owner has found that it is not as clear sailing as he expected it to be, and has practically quit.

Mr. PETRIE. Has the range so changed that this extra feed is necessary?

Mr. OLSON. Yes. The seasons have been dry, and as our stock has become more valuable it has become more necessary to take care of it. We figure on protecting the outfit for about a hundred days, with a quarter of a pound of cotton seed, a half a pound of corn, and some hay. We very seldom raise alfalfa hay, but have it shipped in from the Snake River country in Idaho.

Mr. AUSTIN. What does one-quarter of a pound of grain and half a pound of corn cost per head?

Mr. OLSON. About $80 to $90 a ton for cotton seed and $3.50 extra for corn laid down at Union Pacific points on the Rock Springs lease.

Commissioner CULBERTSON. Do you consider it more profitable to combine sheep raising with cattle raising, agriculture, or other pursuits?

Mr. OLSON. We are not in an agricultural country. I have cattle because we grow a lot of rough hay that is not good for sheep.

Commissioner CULBERTSON. What are your chief irrigated crops?

Mr. OLSON. Wild hay.

Mr. MCCLURE. How far is it from your summer to your winter range?

Mr. OLSON. About 150 miles.

Mr. MCCLURE. That is true of pretty nearly everyone in that section, is it not?

Mr. OLSON. That is the average. Some of them probably go farther than that.

Mr. MCCLURE. How long does it take to travel the 150 miles?

Mr. OLSON. The time required depends upon weather conditions. We try to use the time between coming from the forest, about the 1st of October, until the 15th of December in the 150 miles. We skirmish around on the ranges where we shear and on the public land.

STATEMENT OF MR. R. H. WINDER, REPRESENTING THE MURRAY SHEEP CO., SALT LAKE CITY, UTAH.

Mr. WINDER. Our range is in Nevada, Utah, and Colorado—principally in Nevada. The summer range is in Lincoln County, Nev. It is not in a national forest.

We have invested there $10,000 in scrip of different character, soldiers' addition and Sioux Indian. This is unsurveyed land.

Commissioner CULBERTSON. What do you mean by "scrip"?

Mr. WINDER. That is given in lieu of land taken by the Government for a national forest, for water sites, or any other reason.

Commissioner CULBERTSON. Does that give you the privilege of running over land which you do not own?

Mr. WINDER. Yes; over some public land. In Utah and Nevada they improve a water right by building reservoirs. In some instances they run a tunnel a quarter of a mile and lay pipes. We take that water down, reservoir it, and put in troughs for drinking or for the sheep.

Commissioner CULBERTSON. Your winter ranges are where?

Mr. WINDER. They are in Nevada on a lower altitude, adjacent to the summer range.

Commissioner CULBERTSON. What type of sheep is most successful?

Mr. WINDER. The cross bred. We started our flock with the Merino ewe, now known as the Rambouillet. We crossed those with the Cotswold and Lincoln and then bred back to the Merino, getting a comeback, or three-eighths blood. We are trying to maintain that strain by using the same cross of rams, and so far have been successful.

Commissioner CULBERTSON. Will you describe your equipment?

Mr. WINDER. The winter equipment is a wagon fitted with a stove and the things common to that class, while the summer is a pack outfit, mules, tent, etc.

Commissioner CULBERTSON. What is your investment in equipment per 2,500 sheep under winter conditions?

Mr. WINDER. About $600, including wagons and teams. We have two men to whom we pay $100 a month, the cheapest labor we have. On a year's basis, their keep is about $50 per month.

Commissioner CULBERTSON. What type of labor do you use?

Mr. WINDER. Generally the Basque or Spanish.

Commissioner CULBERTSON. On the summer range what does your equipment amount to?

Mr. WINDER. Probably $300. We have the same number of men and pay the same salaries as in the winter.

Commissioner CULBERTSON. Where are you summering in Colorado?

Mr. WINDER. In the Steamboat country, up on Moffat Road. It is a forest reserve. We have been feeding there and not going on the range in winter. We also have flocks at Price, Utah.

Commissioner CULBERTSON. Where do you summer in Utah?

Mr. WINDER. On public land, under conditions very similar to those in Nevada. We go down for the winter onto the near-by desert, where we have sufficient hay stacked for an emergency.

Commissioner CULBERTSON. Do you place more emphasis on wool or lambs?

Mr. WINDER. We have received a larger revenue from wool than we ever did from lambs, especially in the last few years.

Commissioner CULBERTSON. Do conditions tend to make the wool business uncertain?

Mr. WINDER. We have no assurance that we can maintain our present holdings on account of transients eating us out. I would favor Federal ownership of public lands under some system similar to the forest reserve.

Commissioner CULBERTSON. Do you grade your wool?

Mr. WINDER. We grade our sheep. We have different grades in our different bands. We do not grade the wool on the Australian plan.

Commissioner CULBERTSON. Were the Government grades established last year satisfactory to the woolgrower?

Mr. KEARNES. Not altogether, as there would be a variation of 10 cents a pound in the shrinkage of the same class and grades of wool from the same identical flocks.

Commissioner CULBERTSON. Mr. McClure, were the woolmen satisfied with the Government prices?

Mr. MCCLURE. Yes; taking the country as a whole. There has been some complaint, but in handling 300,000,000 pounds it is beyond human capacity not to err. The Government never did anything before as near right. I investigated many complaints, and I did not find a single case in which the Government was at fault. The woolgrower was honestly in error. I investigated many cases wherein the charge was made that a band of sheep had been divided and one part appraised at 10 cents a pound higher. In one case in Colorado I found that the sheep had been divided six months before and had run on different ranges. One man had taken out the old ewes and the other the young ewes. Instead of a difference of 10 cents a pound there should have been a difference of 12 or 15 cents.

The breeders of Rambouillet wool complained bitterly, but their wools are invariably short and very little of it falls within the staple class, although the growers think it does.

Under the Government proposition last year I received 60½ cents for my wool. This year I could not get an offer of 40 cents.

Mr. CANDLAND. This is not a question of price but of whether the Government furnished any information to the growers concerning classification.

Mr. MCCLURE. The first appraisals did not show the grade and shrinkage of the wool, but the later ones, under the War Industries Board, showed the exact number of pounds in each grade.

Mr. CANDLAND. Just as it did when we shipped to Boston.

Mr. MCCLURE. It showed the value and shrinkage of each grade. There isn't any more to know about wool. I am partly to blame that the original reports were in error. But we finally recommended that the grower's statement should show the number of pounds in each grade, the number of grades, and the shrinkage.

I blame the woolgrowers for the trouble they have in marketing.

Mr. KEARNES. If the Government had kept its hands off from wool, would we not have gotten a better price last year and this? If we had gone to the open market, as the cotton people did, would we have been better off during those two years? This year the Government held over part of the wool and brought it out in competition at a time when we should have been getting good prices.

Commissioner CULBERTSON. That was a temporary war condition and has little bearing on the future. Have you attempted cooperative wool sales?

Mr. WINDER. No.

Commissioner CULBERTSON. Have you any suggestion as to improvements in marketing?

Mr. WINDER. It could be materially improved if more care was taken in grading and in keeping out objectionable parts such as the tag lots.

Commissioner CULBERTSON. Is there a tendency among producers to market their wool upon certain terms agreed upon between themselves such as the cooperative warehouse proposition in Chicago?

Mr. MCCLURE. There is no cooperative wool market in this country, except public wool auctions in the State of Oregon. When a man gets a carload of wool he sells it himself. Whenever we have been able to get the men who have two, three, or four thousand pounds of wool to amalgamate and sell at auction we have obtained the full market price.

Commissioner CULBERTSON. Australia has established auction sales. Could you do likewise, instead of sending to Boston and Philadelphia?

Mr. MCCLURE. Yes, as far as the little fellow is concerned. In the State of Ohio they accumulate something over 3,000,000 pounds of these small clips to sell at auction. We can not get the woolgrower either to send to the warehouse in Chicago or sell at auction. We have not made any progress in disposing of wool in 10 years. Each man sells his own, and many even before shearing.

Mr. BOYLE. Is that because we have so many different grades?

Mr. MCCLURE. No.

Commissioner CULBERTSON. You feel that individual sales leave the woolgrower at the buyer's mercy?

Mr. MCCLURE. Yes. Last year at Mountain, Utah, the woolgrowers sold for 45 cents a pound when wool was worth 55 cents. That 45 cents fixed the basic price, and consequently hurt every man in Utah. They should not be allowed to do that. If they had been offered 45 cents, they could have asked 50. The buyer would have gotten the wool for 40 cents if he had not been afraid that some other buyer would take it away from him.

Mr. AUSTIN. How much wool was there in that lot?

Mr. MCCLURE. As I remember, it was 750,000 pounds. Mr. Winder, do you ship any sheep between ranges?

Mr. WINDER. Yes. We ship from the Nevada range into Price, Utah, at about $70 per car. We ship only one way.

Mr. McCLURE. Could you run sheep without Merino blood in Utah?

Mr. WINDER. I would not want to try it.

Commissioner CULBERTSON. What is the carrying capacity of the ranges which you own?

Mr. WINDER. We need at least 4 acres of summer range per sheep, and fully as many in Nevada on the winter range.

Mr. CANDLAND. It would take nearly 20 acres of waste desert to maintain a sheep six months.

(Mr. Ostler and Mr. Austin agree with the above statement of Mr. Candland.)

Mr. WINDER. There are thousands of acres that do not raise anything.

STATEMENT OF MR. JAY H. CLEMONS, REPRESENTING THE UNION LAND & CATTLE CO., RENO, NEV.

Commissioner CULBERTSON. Where are your ranges, Mr. Clemons?

Mr. CLEMONS. We have sheep in Nevada and in California, but I would like to mention particularly those in the eastern part of Nevada, in Elko County. So far as the cost of equipment is concerned, and so on, the situation is about the same. We are forced, in order to stay in the cattle business, to run sheep. The principal feed is wild grass and hay. We are limited in production of feeds and must have cattle for that wild hay. To hold the cattle range we have had to skirt outside of our ranges with sheep in order to keep out people who do not own any land.

Commissioner CULBERTSON. You own land in this county?

Mr. CLEMONS. Yes; in that particular locality there are 101,000 acres, including farm and grazing land. We put the sheep on the outside and keep the cattle in the middle. The grasses, the button sage, and rabbit brush are disappearing so fast that the cattle do not get a balanced ration. Then there is the white, the salt, the black, and the curly sages.

Mr. KEARNES. Both cattle and sheep feed on green greasewood.

Mr. CLEMONS. We can not control the land as far as horses and cattle are concerned. I do not know the trespass laws in other States, but in Nevada we can hold the sheep out, or any stock that is herded. Now, land around the forest reserves is congested, for which a great many people blame the forest service.

We have in Nevada about 70,000,000 acres of grazing land, besides about 10,000,000 acres of summer grazing land. The forest reserves have 6,000,000 acres of that, and there are about 4,000,000 acres outside.

The forest reserve gives the preferential right. Any man who has improved ranch property has an "A class" preferential right, and there is no provision which forces him to own a lambing or a spring range. Therefore you have a congested area on the balance of the 4,000,000 acres. Ten years ago no one would have recognized the southern part of the State as sheep country during the summer. The Government should put into effect regulations requiring so many tons of hay to be raised for so many cattle, or that one must own a spring range before being allowed a permit on the forest reserve.

We have a serious condition in the cattle business, different from that of any other State. Out of 70,000,000 acres of land only 7,500,000 acres are taxable. Of that 7,500,000 acres, 6,500,000 are grazing lands. We have 650,000 acres of cultivable land. About 1.37 per cent of the taxable land is cultivable. This was recognized by Congress. We got some of our land in the public domain, not including the sixteenth and thirty-sixth sections, by selection. We are the only State in the Union that had that privilege.

It is necessary that there should be some regulation governing the remaining 40,000,000 acres of public domain, or we shall have to go out of the cattle business. Statistics show that cattle are being reduced while sheep are increasing.

Commissioner CULBERTSON. What type of Government land control would be most satisfactory to you?

Mr. CLEMONS. The State Live Stock Association, of which I am vice president, is in favor of range control under Government supervision, similar to the forest reserve; but we are also in favor of rules and regulations applicable to our State. We have an overabundance of winter grazing land, and it is no more than right that the people from Utah and Idaho should have the privilege of using it, but at the same time we should be protected where we have land that is only used by cattle, as under these conditions we can not use it for sheep.

Both sheep and cattle men are in favor of the supervision of the public domain under the forest reserve.

Commissioner CULBERTSON. Has there not been a good bit of dry farming in your State?

Mr. CLEMONS. Yes; but not successful, because our precipitation is only 8 to 9 inches, and dry farming requires about 12 inches.

Mr. MCCLURE. I understand that the investment of these men in lands and equipment is as great or greater than the investment in sheep.

(After a general discussion it was agreed that the statement was true.)

STATEMENT OF MR. MORONI A. SMITH, OF SALT LAKE CITY, UTAH.

Commissioner CULBERTSON. Where do you live?

Mr. SMITH. My home ranch is over in eastern Utah, in the Uinta Basin, in the eastern part of Wasatch County.

Commissioner CULBERTSON. Where are your summer ranges?

Mr. SMITH. A small portion of the private summer range is in the Uinta National Forest. These lands were an old Indian reserve and were offered at auction in 1910, 1912, and 1917. They will continue to offer them as long as any remain.

Commissioner CULBERTSON. Where do you winter?

Mr. SMITH. In the eastern part of the State, on the east and west sides of Green River.

Commissioner CULBERTSON. What difficulty do you have in getting from one range to the other?

Mr. SMITH. We have some trails through, for probably 10 to 20 miles, and individual sheepmen have purchased sections of ground en route to prevent the closing of the balance. We give and take from each other at the present.

Commissioner CULBERTSON. What type of sheep do you handle?

Mr. SMITH. I usually try to keep about 50 per cent loose wool, Cotswold, and 50 per cent Merino. They range anywhere from high-grade Rambouillets to high-grade Cotswolds.

Commissioner CULBERTSON. Do you breed chiefly for mutton or wool?

Mr. SMITH. Until two years ago I always used the mutton ram. That country is adapted to fat lambs and was the first place in the West to specialize in mutton lambs.

Commissioner CULBERTSON. Do you get a larger per cent of your gross profit from lambs or wool?

Mr. SMITH. Slightly, though wool is an essential product. The lamb crop has been furnishing from 60 to 65 per cent of the gross receipts. I would like to

continue that arrangement, but on account of the forest reserve reducing my grazing privilege, I had to summer upon four ranges, and will have to return to the wool basis.

Commissioner CULBERTSON. Do you fatten your lambs on the ranch or raise feed for them?

Mr. SMITH. Fat lambs of 4 months average age are fattened right on the milk.

Mr. PETRIE. What kind of rams do you use?

Mr. SMITH. We generally use Cotswolds and occasionally a few Lincolns, which is the general practice through that reserve.

Mr. WINDER. His condtitions are peculiar to that part of the country and not general in the State of Utah. It is the very best part of the State for marketable lambs.

Commissioner CULBERTSON. Where do you market your lambs, Mr. Smith?

Mr. SMITH. On the Kansas City and Chicago markets.

Mr. MCCLURE. The Uinta Forest Reserve has the reputation, among forest people, of containing some of the best sheep ranges in the entire 135,000,000 acres of national forests.

Commissioner CULBERTSON. What is the carrying capacity?

Mr. SMITH. About an acre and a quarter to an acre and a half per sheep for three months in summer. It takes from 2 to 3 acres for May, June, and October, and from 10 to 15 acres in winter. There is very little waste land.

Mr. MCCLURE. What do your lambs weigh, Mr. Smith?

Mr. SMITH. About 90 pounds docked.

In regard to losses, I have not been able to get less than 10 per cent. Nearly 12 per cent of the ones we start out with in the fall are killed by predatory animals. And that is normal and does not include losses from extraordinary causes. I have found that we have about 2 to 3 per cent loss immediately after docking. It has never been less than 5 per cent during the summer time, and this year is going to run up to 8 or 9 per cent. We put our total lamb loss at 10 to 11 per cent from the 10th or 15th of June to the 10th or 15th of October, or until we make our final shipments and get our sheep into condition to carry over to the next season. That is also about the losses of my neighbors, when we get right down to the books.

Commissioner CULBERTSON. How much do you charge off for depreciation of ewes?

Mr. SMITH. I do not charge off. I replace them by purchases, or if I replace with my own lambs I put them in at their market value. Whatever it costs to make replacements—sheep, equipment, horses, or anything else—is charged as depreciation. If I lose a horse I buy a new horse and do not charge it up as an additional purchase. The same with my sheep. Depreciation and replacement is not less than 10 per cent. The ewes are not serviceable after six years, for the cross breeds it is eight years, and for the Rambouillets probably an average of seven years, requiring one-sixth or one-seventh replacement every year.

Mr. MCCLURE. Do these people who keep books and make a practice of selling all their lambs and buying ewes carry a depreciation of 10 per cent?

Mr. WINDER. We only run our sheep to a certain age. We will cut out and sell from 2,000 to 3,000 each year. We put these sheep on the market at about half price, and that is our depreciation. With the sheep that we lose outright and those required to make our herds good, it takes 25 per cent replacement every year.

Mr. PETRIE. That is a very important point.

Mr. WINDER. That is what we have been doing for 10 years.

Mr. McCLURE. That has been a serious matter in Idaho. The sheepmen bought their ewes and did not carry depreciation on their books. They had not been saving any ewe lambs and about three years ago found that they had nothing but a lot of broken-mouth ewes and that, instead of making money as they went along, everybody had to borrow to buy a new outfit. Now they are carrying depreciation.

Mr. PETRIE. Depreciation depends upon the section of the country. I can cite you localities where ewes are good for nine years and others where they are not good after five years.

STATEMENT OF MR. THOMAS AUSTIN, OF SODA SPRINGS, IDAHO.

Commissioner CULBERTSON. Where do you live, Mr. Austin?

Mr. AUSTIN. At present in Soda Springs, Idaho, where we have about 25,000 sheep.

Mr. McCLURE. As our country settles we are developing a very expensive but necessary habit of shipping sheep between ranges by train, and I want Mr. Austin to tell you how they handle their flocks.

Commissioner CULBERTSON. On what type of range land?

Mr. AUSTIN. We are running on land that we own or lease or on which we have a permit from the forest reserve. We lease land close to what we own from the State of Idaho and the Indian reservation. Some of our ranches are rather extensive. We have one in particular that grows a lot of hay. We handle about two thousand head of cattle on practically the same range that the sheep run on.

Commissioner CULBERTSON. Where is your winter range?

Mr. AUSTIN. In Elko County, Nev.

The ranges are some 200 miles apart and 90 miles of the trail is a lane. We can either ship the sheep at a cost of 40 cents a head or trail. For the last 10 years we have trailed down and shipped back. Trailing depreciates sheep so much that this year I am going to cut out 3,000 head before I start down. Anything that is the least bit thin we shall send by rail. It has been necessary for the last four or five years when we got to the other end to cut out a band and put them on corn. Ten years ago the entire country was open, and we gradually grazed down.

Commissioner CULBERTSON. Do you buy water for them?

Mr. AUSTIN. We buy feed. We wait until we can get a little snow. Most of these places are dry farms and haven't water, except what they haul. Down there we have leased over 200,000 acres, which is about half of the land in that block, from the Southern Pacific Railroad.

Commissioner CULBERTSON. Is that lease comparatively secure?

Mr. AUSTIN. We only get a yearly lease, but they tell us that we shall have it if it is leased. The price of the lease was raised 25 per cent this year. We are paying over double the price five years ago. We are paying $4,400 for about 200,000 acres. We have about 8,000 acres of our own.

Commissioner CULBERTSON. Will those conditions gradually drive you out of business?

Mr. AUSTIN. There is no question about it, unless the price of our product keeps pace.

Commissioner CULBERTSON. I wish you would speak of the 640-acre homestead act.

Mr. AUSTIN. That has not affected us as much as it will. Applications have been made, but until they have been approved we pay no attention to them.

When those people get those lands it means we will have to own every foot we run over, and there is no grazing land in our vicinity less than $10 an acre.

The only thing that has kept us in business the last two or three years is that 25 to 30 per cent of the range has been our own.

STATEMENT OF MR. GEORGE AUSTIN, OF SALT LAKE CITY, UTAH.

Commissioner CULBERTSON. Where are your ranges?

Mr. AUSTIN. In Wyoming and Utah.

Commissioner CULBERTSON. How many sheep do you run?

Mr. AUSTIN. About 1,500 head of Cotswolds. They are not pure blood, but are very high grade. I run pure-blood rams with them.

Commissioner CULBERTSON. Do you breed sheep chiefly for lambs or wool?

Mr. AUSTIN. I breed for the males and sell to the sheepmen here. We increase our herd very slowly. We never sell any young ewes—only the rams and old ewes. I have just sold 300.

Commissioner CULBERTSON. What is the tendency in this part as to breeds?

Mr. AUSTIN. The tendency now is toward the tight wools—the Merinos. We almost had to give away our bucks this year. Three or four years ago the demand was for loose wool.

Commissioner CULBERTSON. Regarding the shipping of sheep from one part of the country to another, do you think that the industry is destined to undergo a reorganization in the next decade?

Mr. AUSTIN. We will continue to ship. You can not summer on a winter ranch nor winter on a summer ranch. The last two years have demonstrated that no flock master is safe on his winter ranges without some feed for an emergency.

Commissioner CULBERTSON. Mr. McClure, what is the answer to this physical situation?

Mr. MCCLURE. Ownership of winter and spring ranges. We will go on shipping between the ranges and feeding more and more on the winter range, until we ultimately have a deeded land proposition, with the exception of the deserts.

Mr. PETRIE. Will the deserts be handled by the Federal Government?

Mr. MCCLURE. I was in Washington, and there is no sentiment there in favor of control of the public domain.

Mr. AUSTIN. It is a question of more feeding and of a breed of sheep that will produce more wool and mutton. We must feed more, because feed is getting scarcer on the range. A short time ago I moved a flock of Cotswolds out of a foot of snow and trailed them down to the winter range. They will be shipped to Boxelder County, Utah, and lambed and then shipped back.

Regarding the Government's policy of handling wool last season—1918—I want to say that our wool was shipped east and sold like many others. We got an itemized statement of every kind and grade, and the number of pounds in each and what it brought, which is something we have never had before. I do not think we should have gotten more, and I for one am well satisfied.

CONFERENCE AT BOISE, IDAHO, OCTOBER 27, 1919.

STATEMENT OF MR. HUGH SPROAT, OF BOISE, IDAHO.

Commissioner CULBERTSON. Where do you have your sheep, Mr. Sproat?

Mr. SPROAT. Our summer range is at the headwaters of the Boise River, on the Boise Mountain Forest. We range within a hundred miles of Boise, practically, all the time.

Commissioner CULBERTSON. How many and what type of sheep do you have?

Mr. SPROAT. We run about 14,000 ewes, mostly cross-bred, and generally Hampshire bucks. We are now moving into the foothills, about 15 or 20 miles south and east of Boise. Our winter quarters are on the Snake River, about 20 miles south of Nampa and about 125 miles from our summer range. We raise considerable hay for spring and fall, in case of severe storms.

Commissioner CULBERTSON. How do you get from one range to the other?

Mr. SPROAT. Sometimes we ship our ewes and lambs about 40 miles, some in the spring from our winter lambing place; but most of the time it is trailing, which, on account of the sagebrush, is hard on the wool and likely to occasion severe lamb losses. Shipping is cheaper where service does not hold you on the cars more than three or four hours, and is less expensive than paying fines for trespassing.

We have difficulty in trailing, due to the water holes being taken up by homesteaders. It has just begun to affect us seriously. We have a 2-mile limit law in this State, forbidding us to graze within 2 miles of a homestead or inhabited dwelling. As homesteaders under the 640-acre act must maintain a habitation, this law is a serious handicap. Private ownership will work out in the long run.

Mr. MCCLURE. They have the 2-mile limit law in Arizona, but have never enforced it.

Commissioner CULBERTSON. Do you have buildings and equipment for lambing?

Mr. SPROAT. On the winter ranges we have sheds and corrals, mostly of lumber covered with canvas.

Commissioner CULBERTSON. Has control of the national forest been satisfactory?

Mr. SPROAT. It has been very satisfactory, although I might say that there is a conflict brewing between the cattle and the sheep industry. The general impression is that sheep are hard on the ranges. My experience is that where sheep are ranged exclusively the range is improved, but where large numbers of cattle are turned in it rapidly goes to pieces.

Commissioner CULBERTSON. What is the best solution of this land question?

Mr. SPROAT. Let the land go to private ownership and let this 640-acre homestead act go. These homesteaders are going to prove up and obtain some kind of a loan and then abandon these claims, the same as they did the 320-acre claims. These lands can then be leased. While present prices seem high, a lease gives exclusive right to the range.

Commissioner CULBERTSON. I had the pleasure on Friday and Saturday of seeing some actual conditions on the range. Dr. McClure and I went with Mr. A. J. Knowlin across the Snake River desert and up into the Little Lost River Valley to Mr. Knowlin's ranch. On Friday, we went up to his summer ranges near the Lemhi Forest and down the big Lost River Valley, returning to Pocatello.

What percentage of your income is from wool and what percentage from mutton?

Mr. SPROAT. I estimate 75 per cent from mutton and 25 per cent from wool. The greater emphasis is placed on the lamb crop.

Commissioner CULBERTSON. You sell all the lambs produced from mutton bucks?

Mr. SPROAT. Yes; but we generally breed one band of ewes to Cotswold bucks, and keep the ewe lambs to maintain our flocks. We buy some white-faced ewes and lambs in Oregon.

Commissioner CULBERTSON. How do prices of lambs in this country compare with those in England?

Mr. SPROAT. When our lambs are bringing about 18 to 20 cents a pound we are getting fairly close to British prices. I think lambs are selling as high as 60 and 64 shillings back in the old country—that is gross $15. Our gross in Chicago would be about $12 for the best lambs.

Commissioner CULBERTSON. How does the quality compare with those in Great Britain?

Mr. SPROAT. We have a much better lamb; that is, on the basis of actually taking them off of the range. I am speaking with reference to South Scotland.

Commissioner CULBERTSON. How do you handle your sheep on the summer range?

Mr. SPROAT. We generally run 10,000 ewes and 4,000 yearlings, in nine bands, with a herder for each, a camp tender for each two bands, and one foreman for all.

Commissioner CULBERTSON. What do you pay your men?

Mr. SPROAT. I pay the foreman $125 a month, the herders and camp tenders $90 to $100. In 1910 the foreman received $60 and herders and camp tenders $50. We furnish food and equipment and everything except beds. We estimate it costs each camp, men and dogs, from $35 to $40 a month per man. There are generally two dogs with each band, which cost quite a bit at present.

Commissioner CULBERTSON. Of what does your equipment consist?

Mr. SPROAT. In summer we have an ordinary tepee tent and pack horses. In winter we use the standard type of camp wagon. The wagon, team, and harness is worth from $400 to $500, about 33 per cent higher than in 1910.

Commissioner CULBERTSON. What is the camp fare?

Mr. SPROAT. They have flour for bread, canned corn and peas, and now they also want canned beans. They have canned milk for coffee, dried fruit, prunes, peaches, apricots, and raisins, also potatoes, rice, beans, sugar, and sirup. They have bacon, ham, and eggs, and they generally take the best lambs.

Commissioner CULBERTSON. Would you rather do business under the costs and prices of to-day than of 1910?

Mr. SPROAT. Under the cost prices of to-day, if labor was as efficient as formerly. Fifty per cent of the men are fairly efficient and the other 50 per cent vary from inefficient to totally useless. Some have been with me five or six years. Others stay a month. They leave a band and go to town and don't even notify you.

Commissioner CULBERTSON. Do you hand or machine shear?

Mr. SPROAT. Up to last year I did mostly machine shearing, but the machine shearers we had spoken for went on a strike and I had to take any crews I could get.

Mr. McCLURE. In going to the summer range from the winter, and vice versa, are a good many arrested for trespassing, for coming within 2 miles of somebody's house?

Mr. SPROAT. I was arrested three times last year. We are generally sued for damages, but get a decision against them. If they can get easy money, they will arrest you every day. It is expensive, but you had better fight, so they will leave you alone.

Mr. McCLURE. As a matter of fact, there are some people in this country that are making a living out of preying on the sheepmen, are there not?

Mr. SPROAT. Absolutely.

Mr. McCLURE. What percentage of homesteads have been abandoned?

Mr. SPROAT. Toward Sunnyside and the Black Creek country, 90 per cent. In the section between Blacks and Plymouth, for the first 25 or 30 miles, the same is true.

Mr. McCLURE. How did they finance these homesteads?

Mr. SPROAT. They do not need any money. A man takes it up and, if his neighbor has left, frequently helps himself to the house. I do not mean that there are no bona fide homesteads, but most of them prove up expecting to sell sooner or later. They borrow money on these homesteads from eastern loan companies or Government farm loans.

Mr. GOODING. Is not the term "sold out" usually employed when they get a loan?

Mr. SPROAT. Yes; and whoever loaned the money is holding the sack.

Commissioner CULBERTSON. Mr. Butterfield, did the farm-loan bank loan money on these homesteads?

Mr. BUTTERFIELD. They have in the Weiser country. The farm loans in this country have generally been made on the better ranches.

Mr. MCCLURE. The original Tariff Board's report on wool growing emphasized the fact that wool growers in this country could better their condition by devoting more attention to mutton breeds. Our association believes that you can not use entirely mutton breeds on the range. Do you have to have Merino blood in your ewes?

Mr. SPROAT. Absolutely. Whenever we get beyond a half-blood Merino the sheep are subject to great mortality and are extremely hard to handle.

Mr. MCCLURE. In order to have a sufficient supply of cross-bred ewes available it is necessary to maintain somewhere in the country a supply of pure-bred Merinos, Lincolns, and Cotswolds.

Mr. SPROAT. Yes. This could perhaps be overcome by using Rambouillet bucks on these half-bred ewes, getting the come-back lamb.

Mr. CHATTIN. Some fellows are raising Panamas or Corriedales, and some are raising half-blood ewes to sell to the mutton-lamb sellers and are getting these bucks and breeding them to the half-blood ewes, which still gives them a half-blood lamb.

Commissioner CULBERTSON. Mr. Sproat, in what month do you lamb?

Mr. SPROAT. February and April.

Commissioner CULBERTSON. When and where do you market your lambs?

Mr. SPROAT. We ship to Omaha and Chicago, some in June, but more in July and August.

Commissioner CULBERTSON. How do you market your wool?

Mr. SPROAT. This year I sent one car to the National Wool Warehouse in Chicago, and sold two cars at home to the American Woolen Co. They and the large wool houses in Boston have buyers through this section. There is some appearance of competition.

Commissioner CULBERTSON. How much alfalfa do you feed each winter?

Mr. SPROAT. Two hundred tons of hay and 25,000 pounds of grain to 1,000 ewes.

Mr. MCCLURE. Is your investment in sheep greater than in land and equipment?

Mr. SPROAT. Land and equipment is from $8 to $10 per sheep.

STATEMENT OF MR. F. B. GOODING, OF GOODING, IDAHO.

Mr. GOODING. Idaho has become a fat-lamb producing State. Because of the encroachments of homesteaders, there is no longer much open range, and the feeding season is longer than in 1910. The cost of handling is fully 120 and possibly 150 per cent more.

Commissioner CULBERTSON. What percentage of your income is from lambs, and what percentage from wool?

Mr. GOODING. About 70 per cent for fat lambs and 30 per cent for wool. Those percentages are about the same as in 1910. Idaho was developing as a lamb country very rapidly at that time.

Mr. SPROAT. Were you not the first to ship a carload of mutton lambs from Idaho to market?

Mr. GOODING. Gooding Bros. were the first. We were not running together, but the three of us shipped 22 cars of lambs to Chicago in 1896. The fat-lamb industry developed in the Wood River section of the country, and around 2,000 carloads of lambs are shipped out per year.

Commissioner CULBERTSON. Is this industry on a permanent basis?

Mr. GOODING. It is in great danger of being destroyed by the homestead law and overgrazing outside of the forest reserves. The winter season calls for five months of feeding on the ranch; then comes the spring season, with about 60 days on the open range. Our summer range season of about 90 days is spent in the national forests, followed by three months on the fall range. The spring range is very largely used for fall, but in most parts of the State it is being destroyed by grazing and homesteading. You can not run sheep in large numbers on a ranch; you must have a spring, summer, and a fall range, and if you destroy any of these you destroy the industry. Enlarged homesteading is having this effect. Settlers are going on these large homesteads or are buying them up, so that few sheepmen will be able to remain in business except in localities where there is enough grass so they can afford to own the land and pay the taxes and the interest on the investment. In this part of the State the country consists of dry and barren lava, and the grasses are not strong. I can not afford to own it and pay taxes. It takes more land here than where there is more rainfall and less sagebrush.

Commissioner CULBERTSON. What is your solution of the situation?

Mr. GOODING. The extension of the forest-reserve administration over these lands. Some men will probably be more successful in getting control of a large part of the country, and they are doing that. It is likely that all of us would do the same thing if we had the opportunity.

Mr. SPROAT. Conditions vary. In the western part of the State there is practically no vacant land. As you come toward this country there is considerable homesteading and vacant land. In the lava formation in Gov. Gooding's country there are still large bodies of unappropriated land.

Mr. GOODING. In Idaho the ground is entirely too rough to fence. It is solid lava in some places and in other parts the snowfall is so great that it would break a wire fence. The cost of upkeep would be too great.

Commissioner CULBERTSON. Will not the high cost of labor force the industry to some system of fencing?

Mr. GOODING. No. You can not fence up your range. That is an impossibility in any part of Idaho. In some of our mountain ranges the snowfall is 8 and 10 feet deep. A 4-foot snow is common—low, if anything—in a normal winter on our summer ranges in the forest, so that the idea of fencing is out of the question.

Mr. McCLURE. The difficulty of handling sheep during storms and blizzards would make pastures impossible.

Mr. GOODING. Fencing can not be thought of in Idaho with any price that might be paid for wool or mutton. Losses from coyotes, bob cats, and lynx are very large, and a herder is required all the time. There are enough bells on the sheep so that if they are disturbed at night the herder gets up at once. If you are going to fence, you must fence all of your ranges. You can not organize your forces and herd only part of the time. My sheep range at least 100 miles

from their winter range in going and coming to their spring and fall range, so that fencing is out of the question.

The industry can not be saved in Idaho unless the forest-reserve control is extended. The Forest Service has saved the country by keeping the range from being tramped out. The forest-reserve officials have taught the sheep men a great deal about handling their flocks.

Commissioner CULBERTSON. Have you had any trouble with cattle on the forest reserve?

Mr. GOODING. No. I have been running them in common with sheep on a part of my reserve for a long time. However, the cattle are more destructive. They are heavier and break down the hillside.

Mr. SPROAT. Cattle are on the same range practically all the time and keep the grass down. Perennial grasses on the high ranges won't stand over two or three years' close pasturage without being allowed to go to seed. Sheep, as a general thing, do not touch the grass until the fall of the year, and that gives it a chance to go to seed.

Commissioner CULBERTSON. What have you to say of the improvements in marketing wool?

Mr. GOODING. Wool warehouses are giving good service and a great deal of assistance to the growers. Through the assistance of Mr. McClure the growers have been educated in putting up their wool. More intelligence is being used in keeping up the wools.

Mr. MCCLURE. You run about 11,000 sheep now. How many did you run in 1909 and 1910?

Mr. GOODING. About 20,000.

Mr. MCCLURE. I want you to develop the system under which we winter lambs. How much irrigated land do you own?

Mr. GOODING. About 800 acres valued at $170 to $200. We raise alfalfa, grain, and corn for ensilage. My sheep are on the farm five months. There is about one month of fall pasture and four months of feeding. I feed about 200 tons of alfalfa per thousand sheep and 100 tons of corn ensilage. My three silos hold about 350 tons each and cost around $700 each some years ago. I have a 310-foot shed, 20 feet wide, for lambing. It has electric lights and a little railroad with a cart pulled by motors, which carries about 1,000 pounds of chopped hay or 2,000 pounds of ensilage. There is running water in each pen.

Commissioner CULBERTSON. How many men per thousand sheep do you need for winter?

Mr. GOODING. Forty for about 10,000 sheep. Lambing is day and night work. The dropping pen and the whole 5-acre plant is electrically lighted outside and in.

Mr. MCCLURE. What did your lambing plant cost?

Mr. GOODING. About $15,000. Lumber was $23 a thousand then and is $40 now.

Mr. BACON. My son is putting up a $20,000 plant on my ranch 10 miles from Jerome, where he expects to lamb 12,000 ewes.

Commissioner CULBERTSON. Could you extend this winter feeding into the spring and fall and still maintain the industry?

Mr. GOODING. It would be impossible. You must get sheep off the farm to let the hay grow. You can only bring them back in the fall after the hay is cut for the little pasture that has come up. I figure on two months' pasture on my farms. It is essential that at least one-third of our farms should grow alfalfa. The soil is lacking in humus and will not grow more than one or two crops unless first put into alfalfa or clover. Live stock are not only necessary in order to utilize the alfalfa and clover but essential in keeping up the fertility of the soil.

[illegible] not exist without the live-stock industry. Alfalfa is king here. [illegible] been in alfalfa a few years it will raise 50 or 60 bushels of [illegible] 20 to 30 bushels otherwise. Live stock are necessary to make [illegible]. Because of its bulkiness it would be impossible to get suffi- [illegible] of Idaho. We are finding a market for a limited amount [illegible]

[illegible] Mr. Thomson. What is the relation of the sheep industry to the [illegible] national forests?

[illegible] The live-stock industry and the sheep industry especially has [illegible] forests. This is a semiarid country, having snow falls and heavy [illegible] followed by an enormous growth of vegetation. During sum- [illegible] accumulates around the down timber so that when a fire [illegible] impossible to put it out. The large timber companies have found it [illegible] sheep on their holdings. When there are not enough sheep [illegible] they make trails through and give feed permits. Those [illegible] make a fire break. Without sheep the national ranges would be de- [illegible] a few years. In the great fire of 1912 and 1913 about 200 [illegible] and Montana. Fifty-six forest rangers lost their lives [illegible] occurred where there had been no sheep.

[illegible] some Merinos and half-blood ewes. With the Merino I [illegible] and with the half-blood ewe a Hampshire. The half-blood [illegible] sheep, giving a good-sized lamb and 7 or 8 pounds of wool of [illegible]

[illegible] Mr. Thomson. How do you maintain your flocks?

[illegible] by buying yearling ewes or white-faced lambs in the fall. I [illegible] maintain the herd. Regarding the tariff on wool, whether [illegible] the grease or the scoured content, and the duty specific or ad [illegible] and many others had something to do with the evidence [illegible] Tariff Board. Thirty-two of the woolgrowers and manu- [illegible] New York City in 1911 discussed the matter for three days [illegible] agreed—we were about equally divided as between wool- [illegible] and manufacturers in the East—that it was practical and [illegible] a duty on the scoured basis. That resolution was presented [illegible] was recommended, that the duty be assessed on the scoured [illegible]

[illegible] to put a duty on wool without knowing its value. From [illegible] dirt and grease; sometimes it shrinks 20 per cent, or as [illegible] That matter can not be left to the judgment of any man [illegible] should be put to the scouring test.

[illegible] Mr. Thomson. You would prefer a tariff on weight rather than [illegible]

[illegible] I want a specific duty on the wool, because I do not think [illegible] the industry should be subject to the fluctuation of foreign [illegible] industry is going to live, it must be given some degree of per- [illegible] has destroyed the industry.

[illegible] OF MR. A. G. BUTTERFIELD, OF WEISER, IDAHO.

[illegible] Mr. Thomson. When did you start breeding sheep, Mr. Butter- [illegible]

[illegible] in 1892 or 1893. At that time nearly everything in the [illegible] Merino. Previously sheep were kept entirely for their

[illegible] Tariff Board on Schedule K, vol. 2 (1911), p. 581 et seq.

wool. About that time there was some demand for mutton, but it was of secondary consideration.

Before the railroads were built a number of Oregon sheepmen told of having some wethers, from yearlings to 10 years old, entirely toothless. The price of mutton on the Chicago market did not justify shipping from the far West. The American people had not yet developed a taste for mutton.

When we first went into business it was mighty hard to sell a hundred Hampshire lambs, and for several years afterwards the sale was slow. They were using the Lincoln, the Cotwolds, and some Shropshires, and it was difficult to induce a change. On ranges adapted to raising and producing good lambs and close enough to railroads so they don't have to trail or lose a lot on freight, probably 90 to 95 per cent of the rams are now Hampshires. The foundation was mostly Merino and cross-bred ewes.

Mr. McCLURE. Mr. Butterfield, as you are probably the largest breeder of Rambouillets in Idaho, I wish you would explain to the commissioner how the demand for different breeds of rams fluctuates. What happened in 1911 with your Rambouillet rams?

Mr. BUTTERFIELD. About 1911 the country seemed to be pretty well stocked up with Merinos and you could scarcely give them away. The American taste for mutton had developed, and the shipping of lambs from the Western States had begun. The demand was for mutton sheep and coarse wool stuff from mutton breeds and little for the Merino lamb. That went on until large numbers of ewes became too coarse, from constant breeding with coarse rams, to produce better and larger mutton sheep, to be efficiently handled or to withstand range conditions. About that time the price of wool commenced to go up, which developed a demand for the Rambouillet or Merino. This condition was accentuated by the Merino breeders, who could not make ends meet, going out of business and cutting down the supply. The growing coarseness of the foundation flocks and the higher prices of wool again developed a demand for the Merino.

Another reason was that many lamb raisers had been able to get people in Oregon, Washington, and parts of Idaho to buy their Merino-bred ewes; but after the whole country went into coarse wool we were unable to do that, so some commenced the breeding of fine wool stock with crossbred.

Mr. McCLURE. Was 1911 or 1912 the low spot in the demand for Rambouillet rams?

Mr. BUTTERFIELD. There was not much difference between 1910 and 1912. I shipped several carloads of Delaines and Rambouillet rams, which we couldn't sell here, to points in Arizona and New Mexico. They netted about $3 or $4 a head.

Mr. McCLURE. When do you think we reached the apex of Rambouillet values?

Mr. BUTTERFIELD. There has been mighty little difference for three years. We have had an exceptionally strong demand and look for just as strong or stronger this coming year.

Commissioner CULBERTSON. Since 1910 has there been a tendency away from very fine Merino stock?

Mr. BUTTERFIELD. Yes; from the very fine, wrinkly type.

Mr. McCLURE. I would like to have Mr. Butterfield tell you what he considers an ideal range sheep.

Mr. BUTTERFIELD. It is the comeback; three-quarters Merino and one-quarter long wool, either Lincoln or Cotswold. They are particularly hardy and most thrifty under the varying conditions here. The straight half-bred ewe is also a good doer, but when short of feed is mighty difficult to handle. Ordinarily, given plenty of feed, the half breed, or even the full-blood cross ewe,

will range better and produce bigger lambs; but on account of the handling do not do as well. Under fence they would naturally raise big lambs. Owing to the herding instinct of the Merino, if you have a little more Merino blood, they handle better and the lamb is better in proportion.

Commissioner CULBERTSON. What type do you consider best to run with the comeback?

Mr. BUTTERFIELD. The Hampshires.

Mr. GOODING. There is one point that should be brought out. There is as much wool and the standard is maintained as well with these half-blood sheep as with the Merino.

Mr. MCCLURE. What is the amount of your investment at Weiser in land, buildings, and equipment?

Mr. BUTTERFIELD. We have over $300,000 in land and $35,000 to $40,000 in improvements for handling 14,000 sheep.

Commissioner CULBERTSON. What of the homestead problem in your locality?

Mr. BUTTERFIELD. Our headquarters are at Weiser. Our foothill range extends from the headwaters of the Weiser River for a hundred miles. For a number of years it was practically open and we used it in both spring and fall. It is now practically all homesteaded. Under the enlarged grazing feature, matters would be simplified if one owned enough land to run on, but we can not figure to do that and stay in business.

Commissioner CULBERTSON. Have any of those homesteaders stuck?

Mr. BUTTERFIELD. A few have in the lowlands or the foothills or wherever there is any area sufficiently free from rocks to raise crops. The main trouble is they have 10 acres in one place and 5 acres in another, maybe in a few cases 40 to 100, but as a general thing it is never profitable. This range is all taken up and most of them want to sell. It has been absolutely necessary to buy some of it so as not to be entirely dependent on a six months' lease. Those who can are securing Government and corporation loans. It looks as though a person who could wait would get this land much cheaper in two or three years than at present. We feel the necessity of getting some measure of protection so that a bunch of homesteaders can not come out and say to you, "We want so much for our land or you can't run on it." You can not stay on the ranches and farms and you can not go directly from the ranches to the forest reserve on account of snow. As a matter of protection the sheepmen generally have to buy some land. This land cost us in the beginning $6 to $10 an acre, and now they are offering to sell at from $3 to $10 an acre. Many of them have Government loans of $5 an acre, and consequently have no interest in selling unless they can get more.

STATEMENT OF MR. R. P. CHATTIN, REPRESENTING THE BRUNEAU SHEEP CO., OF MOUNTAIN HOME, IDAHO.

Commissioner CULBERTSON. Where do you live, Mr. Chattin?

Mr. CHATTIN. I settled in the south end of Ada County 35 years ago and have been in that vicinity ever since.

Commissioner CULBERTSON. How many sheep do you have?

Mr. CHATTIN. My company is running a little over 20,000 ewes of varied breed. We have quite a few Rambouillet and a few half-bloods of the Rambouillet-Cotswold cross; also some three-eighths, five-eighths, and three-quarter bloods.

Commissioner CULBERTSON. Do you put the greater emphasis on mutton or wool?

Mr. CHATTIN. On wool, and ewes to sell to the mutton-lamb men. We are not in a mutton country. We are south of here in a very dry country, a long way

from the summer range and the railroad. Last year we had no mutton and could not have shipped it if we had.

Commissioner CULBERTSON. Where is your summer range?

Mr. CHATTIN. In the Humboldt Reserve in Nevada.

Commissioner CULBERTSON. Have you the same equipment for a band of sheep on the summer range that they have here?

Mr. CHATTIN. We use a tepee tent, one herder per band, and a camp tender for two bands. We have three foremen in the outfit. On our lambing range we use a wagon. We have a number of little ranches that we have been forced to buy, although they do not produce much.

Commissioner CULBERTSON. What of the land policy in your section?

Mr. CHATTIN. We are in favor of Government control, administered by the Forest Service. We are differently situated from Mr. Butterfield, Mr. Gooding, and Mr. Sproat. There is very little farming country between us and the reserve. Quite a few small ranges have been taken up, but no farming is done. It is dry, rough, rocky country, fit for nothing but ranging. There is nothing in the homesteading business except that some fellow imagines he can make a living by getting a start in cattle or sheep.

Commissioner CULBERTSON. How far is it from your summer to your winter quarters?

Mr. CHATTIN. From the extreme summer range to the ranch where we feed is about 120 to 125 miles. About 75 to 80 miles of that distance is desert.

Commissioner CULBERTSON. How do you handle the water situation across the desert?

Mr. CHATTIN. In the spring and winter there is water in the creeks. In the winter we use the snow. Sometimes we run short on the lambing range and have to haul snow. Some of these creeks are very far apart.

Commissioner CULBERTSON. What type of labor do you use?

M. CHATTIN. We use the Basques nearly altogether.

Commissioner CULBERTSON. Approximately what per cent of the income of your company is from wool and what per cent from mutton?

Mr. CHATTIN. I do not know that I can tell. We feed our wether lambs out and ship them in the spring. We sell a lot of yearlings and ewes to these mutton-lamb breeders, so just our wether lambs go as mutton, while the mutton-lamb growers ship their whole product. I guess our income from lambs is hardly half what it is from wool, as we get the wool of the mutton lambs before we ship. We are raising breeding ewes for the mutton-lamb growers.

Mr. GOODING. There are practically no trails in this country. It is a question of grazing between the winter range and the summer range, and that covers a pretty wide territory. There isn't such a thing as a trail. They call it trailing, but it is really grazing. There must be abundance of forage or else the sheep are going to suffer.

Mr. CHATTIN. By driving from the winter to the summer ranges we are not bothered with the homesteader or the farmer like these gentlemen. Our difficulty lies in shortage of water and feed crossing the desert. We put our lambs on the range the 10th of October, after they have come across 90 miles of desert. There were very few watering places and nothing but desert feed, and when they struck water at the Hot Springs, from the Bruneau River, we lost about 150 head from drinking alkali water.

Commissioner CULBERTSON. What are the causes of loss in the sheep industry in your locality?

Mr. CHATTIN. This year was very dry. They had a law in Nevada which provided that no sheep should come into that State from the quarantined district in Idaho without first being dipped. All of Owyhee County was quaran-

[illegible] time, so we were forced to build a dip works up there a hundred miles from the railroad, take in our medicine, take up our men, etc. Before we dipped, however, the quarantine was taken off of Owyhee County and we did not have to dip to comply with the law; but we discovered about that time that a band of sheep belonging to someone else had broken out with scab. We knew that six days before that we had handled bands of sheep across the trail where this band of sheep had been, so we just dipped them all to be safe. A lot of very young lambs were orphaned from this dipping, as it was a very dry season and there was no green grass to carry them through. Those that did come through were small and undersized. Losses have been heavier this year than ever before, I think.

We get anywhere from 70 to 90 per cent of lambs on the range. We lamb some in February at the sheds, but about 75 per cent is lambed on the range. We had a good many yearling Merino ewes last spring, but the percentage of lambs born from them was a little light. With the dry season and the dipping, I think very much I we got 70 per cent of lambs.

Mr. McCLURE. You understand the Basque problem in the West. Will you explain it to the commissioner?

Mr. CHAFFIN. We have over in that country a large percentage of Basques, who have sheep but no [illegible] else. They do not have any ranches or lands. We call them "tramp sheepmen." We have to protect ourselves against them, so we have been compelled to buy up some of those little ranches on our spring and creek [illegible], and have been compelled to scrip a good deal of the land in order to control the water and to keep these fellows from cleaning us up. We have also leased considerable land and have quite a big investment in land.

Commissioner CLARKSON. These men come from a little province between France and Spain, do they not?

Mr. CHAFFIN. Yes. Most of them are from the Spanish side.

Commissioner CLARKSON. They come here first as herders, do they not?

Mr. CHAFFIN. Yes, practically all of them, I guess. They save their money; they show that they know how to handle sheep; and they will get some Basque who has money to go into partnership.

Mr. McCLURE. They have not contributed to the development of the State in any way, have they?

Mr. CHAFFIN. No; except just what taxes they pay on their personal property.

Mr. McCLURE. They do not have one definite location in which they reside all the time?

Mr. CHAFFIN. No; I think not. The mutton-lamb growers have them pretty well rooted out of this mountain country, but in the dry country they thrive better than the white man.

Mr. McCLURE. That is probably one of the biggest problems in Idaho, is it not, to know what to do with these sheepmen who own no lands?

Mr. CHAFFIN. I do not know about the whole of Idaho, but it is a big problem with us over in my country.

Mr. McCLURE. It is largely due to them that there is a distaste for the sheep business on the part of the general public?

Commissioner CLARKSON. They are good sheepmen, are they?

Mr. CHAFFIN. There are a lot of good sheepmen among them. I do not think they are as good as the Americans, except that they stay with the sheep all the time. We would prefer the American herder, if we could keep him, but we can't. Maybe he will stay a week, maybe a month, and once in a while you get one that will stay with you, but the big percentage of them do not.

The Basque stays with the sheep all the time, and that is one of the reasons they like to have them for herders. That has been my experience with them.

Mr. McCLURE. He does not respect the rights of any man who has sheep or who has a large investment in lands and equipment, does he?

Mr. CHATTIN. No; that is my understanding. We have practically got him fenced out of our range. We own all the water on most of our lambing range either by scripting it or leasing or buying some little rancher out.

Mr. McCLURE. Was that what made it necessary for you to make a big investment there?

Mr. CHATTIN. Yes, sir.

Mr. GOODING. Don't you think there have been more failures among the Basques than there have been among the American people in handling sheep? My experience is that they have not made a success. But few of them have made good sheepmen.

Mr. McCLURE. Many sheepmen throughout the State have had to employ Basques as partners to protect themselves from the depredations of other Basques.

Mr. CHATTIN. We have had to do that same thing. We have some Basque stockholders in our company, and that is one of the reasons why we have Basque employees practically altogether.

Mr. McCLURE. How big an investment in lands and equipment have you down there?

Mr. CHATTIN. The Nelson Sheep Co. has holdings valued at $55,000 and the Bruneau Co. at $45,000, making $100,000 in lands. The range lands which I own are worth about $200,000.

Mr. McCLURE. How many sheep do you run?

Mr. CHATTIN. We are running about 20,000 ewes.

Commissioner CULBERTSON. Mr. Sproat, will you please discuss this question of losses from the hazards of the sheep industry?

Mr. SPROAT. In a good many localities, especially in the fall of the year, when the lambs are coming from the summer ranges, due to the scarcity of vegetation on the trails and the lands that they cross over, the sheep pick up many poisonous plants, and the losses this year in three different outfits have run from 400 to 700 lambs.

Mr. GOODING. The wild cherry in the spring, and in the fall the lupine plant cause loss. After being frosted the pod cracks and the bean drops out. The sheep pick that up.

Mr. SPROAT. Every season, especially in the Warm Spring country and the Wood River country, there has been quite a serious loss.

Commissioner CULBERTSON. The sheep eat these poisonous plants only when they are hungry, do they not?

Mr. GOODING. Yes; when the vegetation is scarce.

Commissioner CULBERTSON. What would you say was the loss from predatory animals?

Mr. SPROAT. During summer from marking time to shipping time it will average a 100 lambs to the band.

Commissioner CULBERTSON. What is your loss from strays?

Mr. SPROAT. I can not answer off-hand. In some bands we practically have no losses, and with others the losses run exceedingly high. I have known of bands losing as high as 100 a month from strays, due largely to inefficient herding.

Commissioner CULBERTSON. Do you have losses in this country from storms and from chilling rains after shearing or any other climatic condition?

[illegible] losses from chilling [illegible] the lambing range be[illegible] [illegible] Lambs do not affect us in [illegible]

[illegible] OF MR. W. H. PHILBRICK, REPRESENTING THE FALL CREEK SHEEP CO., AMERICAN FALLS, IDAHO.

We have about [illegible] per cent of the [illegible] balance crossbred.

[illegible] mostly. [illegible] two years been bre[illegible] [illegible] that cross.

[illegible] 1910. One is over in [illegible] Springs country, and [illegible] sheds and the spring range [illegible] since 1910, or one or [illegible]

[illegible] Pocatello, known as the "S[illegible]

[illegible] part of February un[illegible] [illegible] for lambing about [illegible] The sheds consist of [illegible] built, and have [illegible] adjacent to the [illegible] about 200 be[illegible] [illegible] from the time they [illegible] of January on, [illegible] grain, corn, and c[illegible] [illegible] sheds, and mill feed and [illegible] lambs as we have ewes [illegible] [illegible] exposure and s[illegible] [illegible] the Snake River country [illegible] [illegible] Arm, and remain [illegible] [illegible] poisonous weeds and [illegible] [illegible] comes. In the [illegible] [illegible] the river to our [illegible] [illegible] buy pasturage [illegible] [illegible] that ma[illegible]

[illegible] any reorganization [illegible]

[illegible] a certain [illegible] [illegible] on gro[illegible] [illegible] squatter's [illegible] [illegible] veyed. [illegible] [illegible] so there [illegible] [illegible] under the [illegible] [illegible] as soon as [illegible] [illegible] men of cattlemen for w[illegible] [illegible] pulls up his tent, and [illegible] [illegible] are men who were [illegible] [illegible] saved a little money [illegible] [illegible] the back [illegible] [illegible] the range. They [illegible] [illegible] some land [illegible] and they [illegible] [illegible] find we have [illegible]

can get to the forest reserve in order to get to that piece of grass. We can not afford to go that distance, as we would lose too many sheep. They go through, and while they lose some sheep they also find some. They make use of that grass, and when it is gone find some other place. There is some open mountain country south of American Falls which was not placed in the forest reserve. The settlers heretofore have run small bunches of cattle, horses, and some sheep there, but in the last few years these Basques have been in there entirely. They go to very little expense in providing feed, so that they can pay for some privileges that no legitimate sheepmen could afford and still have a margin of profit. For instance, a man told me last night that he got $100 a week for the privilege of Basques watering on one of his fields. I asked him how they could afford to pay that, and he said that they had gotten off the range in the high hills, where there was no water; that there was some feed right along the edges of the settlement that had not been utilized, and in order to get feed they could afford to pay that price. I think he said there were three different sheepmen. The first man was run out by the settlers; the second and third man each did the same thing over again. No legitimate sheep raiser who has a ranch would dare do that. The Basque can do it, because he never comes back to that locality. When the farmers go out to see him, he says he is a herder and he "no sabes," "that the boss says to stay there"; "that the boss has gone to town for supplies and will be back in a day or two," or something like that, and they tolerate him.

Many of them misrepresent the ownership of the sheep. Continually men come to us with a bill for $50 or $100 damages, saying that our sheep have been on their place. Sometimes they inquire about a responsible and well-known sheepman and tell me that his sheep are trespassing on their place, and I tell them that I do not think so, that that man hasn't any sheep in that part of the country and we haven't any there. On tracing the matter down we find that some Basque is claiming that the sheep belong to so and so, and knowing those men the settlers feel that all they have to do is to go to the owner of the sheep for compensation. The Basques use that method of misrepresentation to escape paying.

Commissioner CULBERTSON. What percentage of the sheep in Idaho is controlled by such men?

Mr. MCCLURE. I should say 25 per cent would be a very conservative estimate.

Mr. CHATTIN. It is more than 25 per cent. In Owyhee County it is 75 per cent.

Mr. PHILBRICK. Some of them have very good sheep, and a lot very poor sheep. They do not take pains to breed well. They use inexpensive rams, and have never contributed anything to the upbuilding of the quality of the sheep in the State.

Commissioner CULBERTSON. Do some of these Basques become responsible citizens and control large investments of land?

Mr. PHILBRICK. Yes.

Mr. GOODING. You can count them on your fingers, can you not?

Mr. PHILBRICK. Yes.

Commissioner CULBERTSON. How are the Basques of the tramp class financed?

Mr. PHILBRICK. They usually have some money of their own, or other Basques finance them. For instance, there are some men who have sheep on shares, or take a percentage interest in the outfit.

Mr. MCCLURE. Is it not a fact that some of our banks have made a business of loaning money to Basques?

Mr. PHILBRICK. Yes; some of the Utah banks have made that their chief business?

STATEMENT OF MR. J. N. BURGESS, OF PENDLETON, OREG., REPRESENTING THE OREGON WOOL GROWERS.

Mr. BURGESS. Conditions in our part of Oregon are very different from those of Idaho. In the northern part we have a strictly deeded land proposition; we have no open ranges. In the northern tier of counties, with the exception of a few small tracts, the land is all deeded, except the Forest Reserve.

It has been homesteaded. The section-homestead law took up practically all the land that wasn't previously deeded. Many of those homesteads have been abandoned and they lease them where they can. The charge for leases is all the way from 10 to 40 cents an acre, varying with the carrying capacity of the land. It is just a question of how much they can get, that is all. The leases run as high as 40 cents an acre, sometimes, for land that has poor carrying capacity and is very rough.

Commissioner CULBERTSON. Where are the summer ranges in your locality?

Mr. BURGESS. They are south of us in the Blue Mountains.

Commissioner CULBERTSON. And the spring and fall ranges are at the foot of those mountains?

Mr. BURGESS. At the foot of the mountains and along the Columbia River.

Commissioner CULBERTSON. Where do you winter?

Mr. BURGESS. We winter along the Columbia and near the foothills of the Blue Mountains.

Commissioner CULBERTSON. You feed during the winter?

Mr. BURGESS. Yes.

Commissioner CULBERTSON. What type of sheep do you run?

Mr. BURGESS. Pure-bred Rambouillet. We are raising rams principally.

Commissioner CULBERTSON. Surrounding you in that part of the country there are men who are engaged in the wool and mutton business, are there not?

Mr. BURGESS. Yes; most of them.

Mr. McCLURE. Will you state the wages paid in Oregon to sheep herders and camp tenders at the present time and in 1910?

Mr. BURGESS. This year sheep herders were paid from $90 to $125 a month and camp tenders from $100 to $150. In 1910 herders were paid about $40 and camp tenders from $50 to $60—$50 most of them.

Mr. McCLURE. Are a great many of your people developing a fat-lamb trade in Oregon?

Mr. BURGESS. We have quite a number that are developing the fat-lamb trade but I think 70 per cent of the trade is in feeder lambs.

Mr. McCLURE. I think you told me that Oregon is one place where wool auctions still survive. I wish you would explain just how your wool is handled at the sealed bid auctions.

Mr. BURGESS. It is handled by the Oregon Woolgrowers' Association. It is put up in lots. One of the buyers will select a sack from each lot. If the man had four bands of sheep, they would probably open four sacks. These are opened in the warehouse and inspected by the buyers, who then put in sealed bids for the wool. You can accept or reject those bids. We have all the way from 6 to 15 buyers, and we usually accept their bids. It has been pretty successful in most parts of our State, and ordinarily the larger portion is sold.

Mr. McCLURE. About the only thing you can do is to accept these bids?

Mr. BURGESS. If you do not, you might as well not ship it, because they won't give you any more.

Mr. GOODING. The woolgrowers feel sure that this whole territory is divided up amongst the wool buyers, and that there is very little competition. One buyer will practically take all the wool in a certain section, and no one bids

against him. It is the exception if there are more than two or three buyers in any part of the country at the same time. We may be mistaken, but we think there is a thorough understanding about the prices of wool here.

Mr. SPROAT. We think there is just an appearance of competition to keep us flimflammed.

Mr. McCLURE. Will you state roughly your investment in land and equipment per ewe?

Mr. BURGESS. Of course, we run our ram lambs over. We always keep our ewe lambs, and in ewes it is about $50 a head.

Commissioner CULBERTSON. That is, your breeding department?

Mr. BURGESS. Yes. It is strictly a range proposition. We run our sheep on the range altogether.

Mr. McCLURE. Taking some of your sheep outfits at Pendleton, what is your investment per ewe?

Mr. BURGESS. I think $25 or $30, maybe more.

Mr. McCLURE. As illustrating the hazardous nature of the sheep industry, what did forest fires do to your range this year?

Mr. BURGESS. The forest fires burned out the range of a little over two bands—about 12,000 acres—so that we were compelled to find other range for them in Baker County.

We have pretty heavy losses annually in our mountains from poisonous weeds, especially among the lambs. This year we had an additional loss of 1 per cent from black bag, the ewes' bags spoiling.

Mr. McCLURE. Do you think the wool auction system in Oregon will continue?

Mr. BURGESS. I do not know. We were pretty well satisfied, most every place this year.

Commissioner CULBERTSON. How many centers are there for auction sales?

Mr. BURGESS. About seven or eight.

Mr. McCLURE. As illustrating the change in the sheep industry from the Merino to the coarse wool, and from mutton to wool, what did your Rambouillet rams average you in 1911 and this year?

Mr. BURGESS. I think about $10 in 1911 and about $45 in 1919.

STATEMENT OF MR. R. N. STANFIELD, REPRESENTING THE MALHEUR LAND & LIVE STOCK CO., ONTARIO, OREG., AND WEISER, IDAHO.

Mr. STANFIELD. We run our sheep in eastern Oregon, Washington, and western Idaho. They are largely run under what is known as the open-range system. They are summered on the forest reserve in the Blue Mountains and the mountains of Idaho and eastern Washington.

We own and control our winter ranges, which, for the sake of security, we have been acquiring during the past 30 years.

Commissioner CULBERTSON. Are those lands which you have taken up for your winter ranges adapted to agriculture?

Mr. STANFIELD. No.

Commissioner CULBERTSON. You consider the land problem in your locality practically solved, do you not?

Mr. STANFIELD. Yes; it is a matter of private ownership.

Commissioner CULBERTSON. Looking over the problems in other parts of Idaho, do you think that those localities must come to the same condition in which you are now?

Mr. STANFIELD. I think without question that they must. We are witnessing the passing of the public domain.

Commissioner CULBERTSON. What type of sheep do you run?

Mr. STANFIELD. We are running principally two types, the first type being the finewool ewe, which we run for the purpose of raising the breeding stock, and the second type is the cross-bred Cotswold-merino ewe, which we cross with Hampshire bucks for the purpose of producing mutton lambs.

Our lambing sheds are located in Umatilla, Baker, and Malheur Counties, in Oregon; Owyhee and Canyon Counties, in Idaho; and Asotin County, in Washington. For our mutton sheep we have lambing sheds in which we have an average investment of $1.80 per ewe. Our average land investment per ewe is about $10. Our average labor cost per ewe will range between $1.80 and $2 per head. In 1910 it was approximately one-third of that. Our equipment in value on our summer ranges amounts to about $750 to the band of 1,200 ewes. That does not take into account the ranch equipment, required to raise most of our hay. That is simply the equipment for attending to the flock.

Commissioner CULBERTSON. You raise alfalfa, I suppose?

Mr. STANFIELD. Mostly alfalfa hay; yes.

Commissioner CULBERTSON. What percentage of income from your flocks is from wool and what percentage is from mutton or lambs?

Mr. STANFIELD. About 33⅓ per cent is from wool and 66⅔ per cent is from lambs. The proportion would be more nearly equal in the breeding ewe flocks than it is in the mutton flocks. I should say 40 to 60 per cent in the breeding ewe flocks and about a third to two-thirds in the mutton flocks.

Commissioner CULBERTSON. How long have you been in business in your locality?

Mr. STANFIELD. Fifteen years.

Commissioner CULBERTSON. What radical changes have taken place in the industry during that period?

Mr. STANFIELD. The most vital and radical changes have been the passing from the free range to the privately owned range; from a land investment of nothing to a land investment for ranges of from $15 to $35 per head.

Commissioner CULBERTSON. Do you have auction sales in your locality?

Mr. STANFIELD. In some localities where I am interested they have auction sales.

Commissioner CULBERTSON. What improvements, if any, would you suggest in the marketing of wool from your locality?

Mr. STANFIELD. The centralization of the clip and the holding of open auction sales instead of sealed bids.

Commissioner CULBERTSON. Do you think that the holding of open auction sales would result in open competition?

Mr. STANFIELD. I think it would to a greater extent than it does now.

Commissioner CULBERTSON. At one time you did have open auction sales in your locality, did you not?

Mr. STANFIELD. Only in a small way. We never have had such centralization of the clip as to bring about open auction sales on a large scale.

Mr. BURGESS. I think the only open auction sales that have been held in Oregon outside of the Government sales have been at one place. The buyers are very much opposed to it.

Mr. STANFIELD. It is quite natural that they should be opposed to it.

Commissioner CULBERTSON. Has the cattle industry gotten into your locality at all?

Mr. STANFIELD. Yes. It is a mixed live stock, cattle and sheep. We run both cattle and sheep.

Commissioner CULBERTSON. Do you find that joint operation is successful and profitable?

Mr. STANFIELD. It has been practicable for us to utilize range for cattle that was not practical for sheep.

Mr. McCLURE. Mr. Stanfield, you are not in favor of the practice, or rather the attitude, of the forest reserve of running cattle and sheep on the same ranges, are you?

Mr. STANFIELD. No; I am not. I do not think it is fair to sheep, for the reason that the cattle are permitted to run at large while the sheep are held to certain restricted areas.

Mr. McCLURE. In a good many sections they are very materially injuring the sheep ranges, are they not?

Mr. STANFIELD. Yes; they are.

Commissioner CULBERTSON. But there is a proper balance between sheep and cattle for the most efficient use of the range, is there not?

Mr. STANFIELD. There is. There are areas that are particularly adapted to cattle raising, and others that are particularly adapted to sheep raising and which would not be suitable for the other.

Mr. McCLURE. Mr. Stanfield is interested in the Columbia Basin Wool Warehouse Co., which is a cooperative wool-selling concern organized by the woolgrowers of Oregon. I thought probably you would be interested in having him tell you how the company handles the wool and finances the sheepmen.

Mr. STANFIELD. The company was organized for the benefit of the sheepmen, for the financing and handling of their wool clip. The company makes two classes of loans, one known as the breeding-ewe loan, secured by a mortgage on breeding stock. The other is a loan made on the fleece. About the first of the year, at the time the sheepman needs additional expense money, they make him an advance on the growing fleece; then, after it is shorn and in the warehouse they make a further advance, equal to 75 per cent of the average market value of the wool.

Commissioner CULBERTSON. They protect themselves by liens on the sheep and the wool?

Mr. STANFIELD. Yes. The later advance is protected by a lien on the wool in the warehouse. The fleece loan is a loan secured by a lien against the sheep and the growing fleece. The first loan is against the sheep and the growing fleece, the lambing crop, and all accretions and increases.

Mr. McCLURE. How much wool did you handle in Portland in 1918?

Mr. STANFIELD. About 12,000,000 pounds.

Commissioner CULBERTSON. From what States do you draw your wool?

Mr. STANFIELD. Principally from Idaho and Washington; some from Montana and Nevada. We handled about 50 per cent of the Oregon clip.

Commissioner CULBERTSON. Does the Portland warehouse grade your wool; and how do they sell it?

Mr. STANFIELD. Yes; it is sorted and graded. It has been sold in the past, excepting under Government administration, at private sale.

Mr. GOODING. What percentage of the woolgrowers of Oregon are interested in that company you just mentioned?

Mr. STANFIELD. A very small per cent are interested as stockholders; but probably 50 per cent or more of the woolgrowers are customers, or have been customers. The wool is handled on a nominal commission. Half a cent a pound is charged for sorting, grading, and selling the wool.

Mr. McCLURE. What rate of interest is charged on the advances?

Mr. STANFIELD. Six per cent.

Mr. McCLURE. And on the stock?

Mr. STANFIELD. From 8 to 10 per cent on the sheep or carcass loans.

Mr. McCLURE. What is the average rate of interest charged by banks and companies loaning money to sheepmen?

Mr. STANFIELD. In Oregon and Idaho it will average 9 per cent at present. Last year it would average very close to 10 per cent.

Mr. McCLURE. That is materially higher than it was in 1910?

Mr. STANFIELD. Yes, sir.

Mr. McCLURE. To illustrate the hazardousness of the sheep business, will you explain some of the unusual losses that you have had?

Mr. STANFIELD. We have had some very heavy losses in sheep. We have lost as much as 20 per cent of a shipment. I recently sent a shipment of 3,000 lambs out of Leavenworth, Wash., to Chicago, and the difference between our loading count and our marketing count was 425 head. Last year I had a loss of seven hundred and some lambs out of a shipment of 4,000 head. We frequently have losses in eastern Oregon and in this section of Idaho, and at Montpelier and Laramie, caused by water founder. During the extreme hot weather, if the sheep are not properly watered at one unloading point, they become so thirsty that they drink too much water at the next unloading point, where they are fed and rested; and they get what we call "water founder." These losses are frequently as high as 5 per cent of a shipment. Usually they are due to imperfect railroad service, congestion, and lack of facilities at the unloading point. Insufficient facilities for watering will cause it or a delay of a shipment in transit.

In 1913 we sheared 6,000 sheep three days before a storm and lost 3,200 of them in the storm, which lasted about two hours. The storm came on us suddenly, and as the sheep were grazing on the range, it was impossible to get them to shelter. That was not only a local occurrence that year; but those losses were general all over the country, wherever bands of sheep that were freshly shorn were caught in the open.

You can not tell when these storms may come. They may come any time from the 1st of March until the 1st of July. It is usually a thunder shower preceded by a hail storm or a cold wave.

Mr. GOODING. I think it can be said for both Oregon and Idaho that no sheepman who has been in business long has failed to meet with some losses. I have had some myself. I lost 400 thorough-bred ewes one year in May in a bad snow storm. Those things can not be avoided. You can not control the elements. You must shear in season in this country, which is from the middle of April through May and June. They can not all wait until the latter part of May or June to shear, because there would not be enough shearers to do the work.

Mr. McCLURE. Are you familiar with some losses from forest fires in northern Idaho and Washington?

Mr. STANFIELD. Yes; particularly in northern Idaho, in the Clearwater district. I know one man who lost his entire flock of some 1,500 sheep, and I know of other instances where from 200 to 500 or 600 head have been lost in fires.

Commissioner CULBERTSON. Can these losses about which you have been speaking be insured against?

Mr. STANFIELD. No. There are no insurance companies taking those risks.

Mr. McCLURE. They will not take insurance on sheep on the western ranges.

Mr. Stanfield, you have a very wide acquaintance among the woolgrowers with respect to their financial condition. Is it your observation that sheepmen are very heavy borrowers of money?

Mr. STANFIELD. Yes; as a rule they are heavy borrowers. The man that is not borrowing is the exception.

Mr. McCLURE. How does the efficiency of the labor which you have this year compare with that which you secured for less money in 1910?

Mr. STANFIELD. Our estimate of the efficiency of labor is that it is probably between 60 and 70 per cent of that of 1910.

Mr. McCLURE. Will you kindly state the relative value of hay this year in Idaho as compared to 1910?

Mr. SPROAT. In 1910 we were buying hay for from $4.50 to $6 per ton. Now we are paying $15 to $17.50 per ton. Furthermore, we buy hay by measurement, approximately 512 cubic feet to the ton, measured around November 1 to November 10. They have gradually advanced that date until some of our hay is now measured about the beginning of September, before it has settled. As a result, I want to emphasize this: The woolgrowers in the State of Idaho have been buying hay around 1,500 pounds to the ton, especially the last two years.

Commissioner CULBERTSON. We have heard considerable to-day about the increase of wages over 1910 and the increase in the price of hay; in fact, in the prices of everything. There has been as much or greater increase in the price at which you have sold your wool, has there not?

Mr. STANFIELD. I do not think so.

Mr. SPROAT. No; I do not think so. When you are paying $15 for a 1,500-pound ton of hay you are buying pretty expensive hay.

Commissioner CULBERTSON. Let me ask the question in this way: Mr. Stanfield, would you rather do business under the cost and prices of to-day or under the cost and prices of 1910?

Mr. STANFIELD. Decidedly under the cost and prices of 1910. Wages are between two and one-half and two and three-quarter times greater than in 1910. The cost of maintaining a herder is the same; cost of hay is between three and four times more, and our land investment has increased from practically nothing to anywhere from $15 to $30. That is the situation in Oregon, and I think it is largely true in Idaho, except that the land investment is not so great.

Mr. PHILBRICK. Mr. Stanfield, does it require more men to handle the same number of sheep than in 1910?

Mr. STANFIELD. Considerably more, because the efficiency of the men that we get to-day is not more than 60 per cent of that we had in 1910.

Also, owing to the crowding of the range, due to settlers, we are compelled to run in smaller bands, and that has also added to the cost of carrying our sheep.

Mr. McCLURE. Mr. Commissioner, these men have testified that 65 per cent of their income was from lambs, and lambs have not increased in value in proportion to the increase in the value of wool. Lambs were selling this year, I will say, at an average of about 14 cents a pound in Chicago, while in 1910 lambs sold for from 7 to 9 cents a pound. Therefore lambs have scarcely doubled in value, and they represent two-thirds of the income of these gentlemen.

Commissioner CULBERTSON. Mr. Gooding, would you rather do business under the cost and prices of 1910 than under those of the present time?

Mr. GOODING. If we could get the same labor efficiency, I would prefer to do business under present prices. However, there is not much difference. Last year was one of our best, and the year before we made scarcely anything at all.

Mr. CHATTIN. It is the other way with me.

Mr. SPROAT. I think that where we do not carry a very heavy landed investment per ewe, that we can have a big investment per ewe, and can do business as it is done now. In Mr. Stanfield's case they have a big investment now, where they did not have any investment in those days, and I think that would be the distinction.

Commissioner CULBERTSON. Looking back over the last 9 or 10 years of the industry in Idaho, would you say that upon the whole it had been prosperous?

Mr. GOODING. Yes; on the whole, I think it can be said that it has been a prosperous industry. I think more money has been made by the sheepmen out of land. I myself have made three times as much out of the increased value of my land as I have out of the sheep business.

STATEMENT OF MR. S. W. McCLURE, SECRETARY OF THE NATIONAL WOOL-GROWERS' ASSOCIATION, SALT LAKE CITY, UTAH.

Mr. McCLURE. Mr. Commissioner, to-day you are in the heart of the world's best sheep industry. I think it can be stated truthfully that the sheep industry in Idaho has been brought to a higher stage of development, brought nearer to perfection, here than at any other point in the world. I think there are, however, very considerable portions of Washington and of western Wyoming and of Oregon where the same degree of efficiency has been reached.

The old Tariff Board, in making its report, intimated that probably the wool-growers could best meet the burden of foreign competition by devoting more attention to the production of mutton. The bulk of Idaho sheep business is strictly on a mutton basis, and I do not know how it can do any better in the production of mutton.

I have listened with a great deal of interest to the answers which these gentlemen have made to your question as to the relative amount of income that they have derived from wool and mutton. I have talked with these gentlemen before upon this subject, always endeavoring to impress upon them the thought that wool is fundamentally the basis of the sheep industry. Now, I think it has been very generally stated here to-day that about one-third of the gross income of the flockmen was represented in the sale of wool and about two-thirds in the sale of sheep and lambs.

My observations have led me to believe that with the sheep industry on a strictly mutton basis, as it is in Idaho, that approximately 40 per cent of the sheepman's gross income will be derived from the sale of mutton and probably 60 per cent from the sale of wool. The sheepman, in selling his lambs, fails to consider that a very large percentage of the income from his lamb is derived from the sale of its wool. There is every reason why the pelt of the lamb, or at least the wool on the pelt, should be credited to the wool account. The packer now buys his lambs largely on the basis of the wool that they carry. That point is proven by the fact that later in the spring, when we go to market with fed lambs weighing from 80 to 110 pounds, there comes a time when there are shorn and unshorn lambs on the same market—in other words, the feeder who has fed his lambs all winter reaches the conclusion that by shearing the lambs at the feeding station outside of Chicago and sending them in shorn and then selling the wool separately that he will get more money than he would if he sent them in with the wool on them. The packers make a discrimination against those shorn lambs ranging anywhere from 2 to 4 cents a pound on a lamb weighing from 80 to 110 pounds. During recent weeks the packers have been selling their lamb pelts at very high prices. One of our Chicago packers about four weeks ago sold his entire supply for that week, amounting to 20,000 lamb pelts, as I recall it, at $3.35 a pelt. Since that time pelt values have declined slightly, but packers' lamb pelts are quoted in Chicago to-day at about $3.10 per pelt.

Now, if we assume that our range lamb is bringing on the market $9 per head, and that is above the average, the packer is deriving out of that $9, $3 for the pelt of the lamb, and the charge against the lamb meat then is only $6. Of the $3 that he derives from the sale of the pelt there is $1 ordinarily that is for the

slat, so that of the $9 that he paid for the lamb there are $2 he paid for the wool on the lamb.

I have worked this thing out on a basis of 100 sheep, just as an illustration. If we take 100 sheep—I will put it in round figures—averaging 8 pounds of wool each, they will shear 800 pounds of wool. Out of every 100 sheep there ought to be 98 ewes and 2 rams. That would apply here in Idaho. But somebody must raise the ewe lambs to take the place of the old ewes that die or later are marketed. So 20 per cent of ewe lambs must be kept in the flock to make up for the loss and the oldest ewes that are marketed each year. Therefore, if we have 100 sheep, there would be 78 ewes, 20 ewe lambs, and 2 rams. Assuming that we derive 75 per cent lambing crop of the 78 ewes it gives us about 58 lambs. Now, those lamb pelts when they go to market total slightly in excess of 4 pounds of wool and sometimes as high as 5 pounds, depending on the age, but with lambs that go in from 4 to 6 months of age they usually have around 4 pounds of wool. That wool to-day is worth about 60 cents a pound, depending on the grade. If you have 58 lambs that go to market carrying 4 pounds of wool each, it gives you 232 pounds of wool more from your 100 sheep. That makes your total wool clip from the 100 sheep 800 pounds and 232 pounds from the lambs that are carried to market on their pelts, making a total of 1,032 pounds of wool from 100 sheep.

The 58 lambs, if they weigh 70 pounds, will dress 35 pounds, so that your 100 ewes in a year have produced 2,030 pounds of lamb meat and 1,032 pounds of wool.

Mr. CHATTIN. Pardon me, but I think you are wrong about that, Mr. McClure.

Mr. MCCLURE. The Commission, in its questionnaire asked this question: "Which would be worth more to you, 8 cents more per pound for your wool clip or 2 cents per pound increase (average for the year) in the price of market lambs?"

Taking 8 cents a pound on 1,032 pounds of wool you have increased your income from 100 sheep, $82.56; taking 2 cents a pound increase in the value of your lamb carcass, and the tariff would have to be on the dressed carcass, you have only increased the value of your 100 sheep $40.60. If you are going to raise the price on the dressed lamb so as to give us 2 cents more a pound on a live lamb, you would have to put a tariff of 4 cents a pound on the dressed carcass, as lambs shrink one-half in killing. I do not think that a tariff on the carcass would result in raising the price of lambs in this country for the reason that we import very few lambs, except occasionally. A tariff might well be placed on lambs to take care of the situation where large shipments are brought in which would demoralize the market temporarily in San Francisco or in New York and in that way demoralize live-lamb prices.

Commissioner CULBERTSON. If we could have the prices on lamb in this country that they have in Great Britain, do you think it would seriously modify the industry in this country?

Mr. MCCLURE. We can not modify it here, because we are as much on the mutton basis as is Great Britain; but if these men could get the same prices for lambs that they do in Great Britain they would not need any protection on the wool.

As illustrating the point I have made, we have 1,032 pounds of wool, derived from 100 sheep, which, at 50 cents a pound, gives a gross income of $516 from the wool. That, of course, includes the wool on your lamb pelt. You have 58 lambs from 100 ewes, which, at $7 a head—I have credited to wool, the wool on the lamb pelt—gives you a gross income from your lamb business of $406 from the 100 ewes. In addition, you have 15 old ewes to sell at $5 per

head, of which $4 goes to meat and $1 to wool. Therefore, your gross income from wool is $531 and from mutton and lamb $466.

I do not think there can be any exception to those figures, Mr. Commissioner. The income from the wool from 100 sheep is $531 and from the mutton and lamb $466. I do not know whether these gentlemen will agree with that or not.

Mr. STANFIELD. I think that is quite correct, Mr. McClure.

Mr. MCCLURE. That reverses it and gives us 45 per cent from lambs and 55 per cent from wool.

The Tariff Commission must not lose sight of the fact that a wool industry developed with mutton sheep is a narrow wool industry. It results in the production of crossbred wool, some of which is very inferior. We can not afford to do that. That is illustrated by the wool-market situation to-day.

Of all the wool that we have in the United States I could sell to-morrow the whole outfit of half-blood and pure Merino wool, without question, at very good prices. We have in our market a tremendous surplus of three-eighths blood, one-quarter blood, braid wools from mutton sheep, for which there is no market. These wools are quoted high, but the manufacturers are not using them Our crossbred wools are obtained from mutton sheep, and when you go to the mutton basis you produce wool for which we have no market to-day; and the industry can not be supported on that basis. We must have fine wools as well as these crossbred wools. If we did go strictly on a mutton basis, such as they are on here in Idaho, then these wools would never be marketable at a fair price and our manufacturers would have to go out of the country to get a sufficient supply of Merino wools to meet their needs. If a mutton policy is adopted everywhere in the world—and it will be finally—we shall ultimately run out of fine wool.

Mr. GOODING. I would like to ask Mr. McClure if it is not a fact that fashions control very largely the use of wools in this country, whether Merino or crossbred wools?

Mr. MCCLURE. Yes.

Mr. GOODING. And that if we go back only two or three years we will find that the Merino wools were a drug on the market?

Mr. MCCLURE. Exactly.

Mr. GOODING. It is not due so much to the difference between wools as it is to the change in fashions. This line of business is almost new. I was a pioneer in this line of work and the first man west of Pocatello to ship a fat lamb to the Chicago market. Now practically the whole country has gone into that line of business. We have reached the peak in the crossbreeding of ewes. I believe there is going to be a return to the Merino ram and to the Merino blood from the two crosses, so that the two kinds of wool are going to be nearer balanced. It will take a few years to bring it about, but I believe it is coming. We are going to get a better balance between the lines of wool that we are growing in the future than we have to-day. We need not fear that this country will not furnish a fair amount of Merino wool as well as of crossbred wool. Australia this year produced about 33⅓ per cent of crossbred, and 20 years ago she did not produce any.

Mr. MCCLURE. New Zealand produces 95 per cent crossbred wool, Argentina 90 per cent crossbred, and the development of the mutton industry has brought us to the point where we have so much crossbred wool that there is no demand for it. We must establish in this country conditions under which men may engage in the sheep business on almost a straight wool basis if we are to have a supply of fine wool.

Commissioner CULBERTSON. That is particularly true of Arizona and New Mexico, is it?

Mr. McCLURE. Yes; but the time is coming when they are all going to switch. If prices hold, the crossbred wools will increase; and if this country is to have its own supply of fine wools, we must establish somewhere in the country a wool business almost entirely on a wool basis.

I do not think there is any use of my discussing the land question. For many years the National Wool Growers' Association has urged the enactment of legislation providing for the control of public grazing lands under a system similar to that used in the national forests. On July 21-23 of this year a convention was held in Salt Lake City, at which was present representative sheepmen and cattlemen from all of the public-land States. That convention passed a unanimous resolution asking Congress to enact legislation extending control of the Forest Service over the remaining public domain. Recently I was in Washington partly to investigate the possibility of such legislation, and it is my opinion that there is not 1 chance in 10 that Congress can be induced to pass any such bill. Congress is determined that the land shall be homesteaded, and it is almost futile for us to discuss this leasing question.

Commissioner CULBERTSON. In your judgment, the most economical and efficient use of the lands out here would be under such a system?

Mr. McCLURE. No. My judgment is that the most efficient use of western lands would come through private ownership. Of course, as Gov. Gooding has said, private ownership will lead to some very large estates, and I think there are very few of the sheepmen who will not agree with me, that from the standpoint of the permanency of this industry it would be desirable to place these lands in the ownership of the men that are now using them. I do not think the Forest Service or any other service can regulate the use of these lands as intelligently or as satisfactorily as can the man who owns the lands.

Commissioner CULBERTSON. And what is your second choice?

Mr. McCLURE. We can not get a leasing bill, and that is my second choice. My first choice can not be obtained except as a matter of evolution; that is, through the homestead system these lands will ultimately pass into the hands of private owners or go on the tax rolls of the State and be sold for taxes. It is probable that some too large estates will develop, but while that is happening there will be a lot of moderate estates and small holdings, which to my mind is the ultimate solution of the land question. I question very much whether we can hasten that day.

When the one-section homestead bill was passed the original bill provided that a man could take up a section of land, and there was no restriction whatever. The National Wool Growers' Association was represented at that hearing. Our association was interested in having a provision put into the law that would provide that a man could not take land which would not reasonably support a family. Had we not put in that provision, there would have been a grand rush for the land, and stockmen would have been put out of business by the time we got home. By having that restriction in it prevented the land from being taken up quickly in large tracts, and it gives the range men a chance to buy them as fast as the homesteader gets title.

Now, the Australian paddock system has been referred to here. That is entirely impracticable under conditions in this country. I do not think men can run sheep in fenced pastures in the United States. Even if we were to lease these lands and could fence them, we would still have to herd our sheep. Because of predatory wild animals and the danger from blizzards and unusual storms, there would not be over three months in a year that a man could safely leave his sheep in a pasture without the care of a herder.

Now, about the financial situation of the sheepmen. While the prices for wool and lambs seem high, the fact remains that the sheepmen to-day, taking the country as a whole, are not in any better financial condition than they were before the war. In fact, there are whole sections in the West where loans to sheepmen have increased during the past two years.

About a year ago I made an investigation of the financial situation of the sheepmen of Idaho. I had before me the record from every county, showing exactly what each man owed and the number of sheep that he ran. That record showed that there was an average mortgage against every sheep in the State amounting to something over $8.50. That does not mean, however, that every sheep was mortgaged, but that there were enough sheep carrying mortgages in excess of $8.50—in fact, as high as $12—to make the average mortgage on Idaho sheep in excess of $8.50.

Commissioner CULBERTSON. You do not consider that condition as evidence of unsoundness, do you?

Mr. MCCLURE. No; I do not. I think it is an evidence of progress. It shows that the sheepman has not been able to save very much money, but has been attempting to place his business on a more permanent basis.

Mr. STANFIELD. Don't you think the increased indebtedness is attributable to a large extent to the acquiring of additional holdings?

Mr. MCCLURE. Yes. They were buying land, building lambing sheds, and making progress. Of course, that situation necessarily shows that they did not have any very big profit out of which they could meet those new expenses.

Mr. STANFIELD. No; they borrowed the money.

Commissioner CULBERTSON. There might be large profits in other lines, and the sheepman might consider it more profitable as a whole for his business to borrow on his sheep.

Mr. MCCLURE. You mean and have money invested somewhere else?

Commissioner CULBERTSON. Yes.

Mr. MCCLURE. I do not think that would be the general thing. There were cases where that did happen, but figures might be produced to show that the sheepmen were not making enough money to meet expenses and make such improvements as they deemed essential.

Commissioner CULBERTSON. Who loaned this money to them?

Mr. MCCLURE. The money is loaned by banks, by loan companies, and by commission dealers.

I want to discuss briefly the question of the marketing of the wool. I think the woolgrowers' associations have been for many years very thoroughly satisfied that the proper system of marketing wool is for the woolgrower to shear his sheep in the usual manner, and to ship his wool to a commission firm. That firm should not be buying and selling wool, but should be a straight wool commission firm. That firm would necessarily have to advance sufficient money to meet part of the growers' operating expenses, and the firm could afford to do that with the wool as security.

The thing that has blocked us in bringing about such a system—not so much in Idaho, but in Utah, Wyoming, and Nevada—is the fact that the wool speculators are men of very large financial means. In the spring the sheepmen always need additional money, even though they have already borrowed what they thought was sufficient to carry them through. They generally go to their local banker for it. Now, it very frequently happens—and I do not say this to discredit the bankers—that these wool commission houses are carrying very large deposits in those banks without interest. When the time comes for the man to sell his wool, particularly the small grower, a wool dealer who has a deposit in the bank will go out and make the small grower an offer for his

wool. This may be two or three months before it is shorn, or may be just at shearing time. Naturally the small grower refers to his banker, and he very properly should. He is frequently advised that while his wool may be worth more later the offer is a fair one, and he sells on that basis.

Now, the bank is not to be blamed. It has to play safe. It has loaned the money to the grower when he could not get it elsewhere. So the banker gives this advice, knowing that when the wool is sold the loan will be repaid. Then some bankers receive a commission on the sale of their clients' wool. Such a practice is criminal.

Selling wool in advance of shearing or through a bank always establishes for the entire wool growing industry a basis of values that are below the actual value of the wool. That has been the thing that the cooperative wool-market concerns have not been able to surmount.

Now, with regard to the Australian system of marketing wool, I notice that the old Tariff Board report intimates that if we prepared our wool under the Australian system it would increase the income of the sheepmen. That system has been very thoroughy tried here and the net income from wool put up under the Australian system, in my judgment, has not been as great as the income from wool put up in the old American way. The cost of classing the wool as they do in Australia, in this country, in some cases is as much as 2 cents a pound higher than the cost under the marketing system here.

Commissioner CULBERTSON. As our wool manufacturers develop the manufacture of finer grades of woolen fabrics it will probably become necessary to have a better classing or grading in this country than we have had in the past.

Mr. MCCLURE. I think the wool ought to be graded along standard lines, but just roughly. I think the grower can do that as well as anybody else. He can grade his fine, half-blood, three-eighths blood, and braid, and that is all he needs to do. The woolgrowers have taken the position that they have the right to sell direct to the manufacturers, and they have always sought to bring about that condition. That is not possible, because the manufacturer who bought his entire year's supply of wool direct from the grower would be as much a speculator in wool as the woolgrower is who sold his wool six months before it was shorn from the sheep. When the sheep are shorn the manufacturer does not know the amount or the kind of wool that he will need, and therefore we can only expect him to purchase such wools as will meet his immediate requirements. He has to meet the competition of other manufacturers and so must buy his wool at the same time and on the same basis as the other manufacturers do.

It would work out about in this way: Suppose a manufacturer came out here and bought a million pounds of wool at the prevailing price to-day. Six months from now wool might drop 10, 15, or maybe 20 cents a pound. That manufacturer could not then compete with his competitors. Therefore I believe that all the grower can hope for or has the right to expect the manufacturer to do is to buy direct only certain small quantities as might meet his needs at the time of buying.

Commissioner CULBERTSON. You would like to convert the big wool houses in Boston into commission houses?

Mr. MCCLURE. If we could just stop them from speculating and get them to take the wool on commission. The grower ought to carry his wool until he finds a market for it. I think that is a sound principle of economics. If there is to be any enhancement in value the grower is entitled to it; if there is to be any loss the grower ought to stand it. Under the present system of marketing wool through speculators we stand the losses and get none of the profits.

My solution of the wool question is to handle the entire clip of the United States on commission, only through commission houses that do a strictly commission business. We have about four firms that do a strictly commission business. The Columbia Basin Co., in Portland; the National Wool Warehouse, in Chicago; and the First Wool Brokerage Co., in Boston, are on that basis.

Arizona wool is largely consigned to Salter Bros. Small quantities of it may go elsewhere, but Arizona has less complaint about her wool market than any State in the Union, and for 10 years she has come nearer to obtaining the full market value for her wool than any other State.

I would like to refer to the question of tariff remedy for the conditions presented to you at this hearing. On September 3, the United States Agricultural Department issued its quarterly report showing 674,000,000 pounds of wool or its equivalent in the hands of dealers and manufacturers on June 30 of this year. Now, on June 30 of this year the entire domestic clip was not on the market. Some of our wool had not yet been sold, and I have taken the liberty of adding 50,000,000 pounds to the Government estimate as representing the unsold wool on June 30. That gives an available stock of wool in the United States on June 30 of 724,000,000 pounds. The manufacturing capacity of American woolen mills under present conditions will not exceed 55,000,000 pounds a month, and my judgment is that during the next 12 months the average manufacturing capacity of American mills, if run to the limit of capacity, will be about 650,000,000 to 700,000,000 pounds of wool.

Commissioner CULBERTSON. You have allowed for the increased capacity that came during the war?

Mr. MCCLURE. Yes, sir. Statistics will show that during the war our Government—for at least one month, as I remember it was in March—consumed 73,000,000 pounds of wool. That was the greatest consumption in any one month in the history of American wool manufacture. But we must remember that that was produced under the stress of war conditions with the mills speeded up to the highest possible point; also that they were working on goods that were not of technical manufacture. In other words, they were making low-grade goods, largely for Army purposes, and which were one-fourth or one-third heavier in weight than the goods ordinarily required by the civilian population. Government overcoating, of which very large quantities were then being made, ran from 30 to 32 ounces to the yard, while overcoating usually runs from 18 to 24 ounces. The woolen khaki that was being adopted for American soldiers was started at 16 ounces to the yard and finally ended up at 20 to 22. The average weight of clothing worn by our civilian population is about 14 ounces to the yard. I think the American Woolen Co. standard-weight goods is 13½ ounces, which is very much lighter than was made during the war. The same loom that was devoting its time to making 30-ounce goods is now making goods that carries very much less wool, and it necessarily follows that our consumption of wool must be very materially reduced from the 73,000,000 pounds, the point reached in only one month during the war. I feel that the estimate of 55,000,000 pounds as the gross consumption or maximum consumption is very liberal.

On that basis of consumption we had in the United States on June 30 sufficient wool to run this country, if not a pound was grown, anywhere from 13 to 15 months, and therefore the necessity for importation does not seem to me to exist. This wool consisted of normal lines, with a fair percentage of each grade.

Commissioner CULBERTSON. But there was a large excess of one-quarter blood wool and lower?

Mr. McCLURE. Yes; they had some excess of three-eighths blood and lower, due to war importations.

The other day the British wool administrator made an announcement that the British Government had in stock wool of a total weight of 1,600,000,000 pounds, which with such portions of the Australian clip as may be marketed before June 30 of next year, makes a very large stock of wool for Great Britain to handle. They naturally want to meet a lot of their war indebtedness and therefore are desirous of selling that wool all over the world. The woolgrowers of this country feel that Great Britain has no right to market any of that wool in this country, and we hope that the Tariff Commission will make recommendation in the very near future urging some antidumping law under which that wool can not be imported into the United States until the needs of this country in the way of consumption will justify the bringing of it here. If the Tariff Commission will see fit to make a recommendation to Congress to place a reasonable duty on imported wool, we hope that recommendation will provide that this duty shall be levied on the scoured content of the wool. We think that matter has been very thoroughly discussed, and what was true in 1912 as justifying that recommendation still justifies it in 1919. And we have the further indorsement that our Government bought the entire domestic clip in 1918 on the scoured basis.

Commissioner CULBERTSON. I would like a word from Mr. McClure on the question of the demand for wool and the supply. In your judgment there isn't any likelihood of the world's price of wool breaking any time soon, is there?

Mr. McCLURE. You mean any serious break or a small break?

Commissioner CULBERTSON. The world to-day is so far behind in its supply of wool that the price is likely to be held up, is it not?

Mr. McCLURE. I think probably it is behind in its supply of woolen goods. I think the supply of wool is above normal. We must take into consideration that what obtains in this country obtains abroad. Labor is very inefficient and the wool-manufacturing machinery of the world is not going to be utilized as well or as fast as we think or hope it will be. We feel that some protection ought to be given us against the possibility of the dumping of this wool on our shores.

CONFERENCE AT RAWLINS, WYO., OCTOBER 30, 1919.

STATEMENT OF MR. J. M. RUMSEY, OF RAWLINS, WYO.

Mr. RUMSEY. I own between 18,000 and 20,000 sheep, and my outfit is on a Rambouillet and Cotswold basis. The foundation of all the herds here, probably, is Rambouillet-Merino. With the coming of free wool we had to produce mutton as well as wool.

Commissioner CULBERTSON. Prior to that time the chief product was wool?

Mr. RUMSEY. Wool was the principal feature. We did not sell lambs years ago until they got to be yearling wethers; now we sell lambs that are 5 to 6 months old, because we breed for a larger lamb.

Commissioner CULBERTSON. With a Rambouillet base, what bucks do you use?

Mr. RUMSEY. To the Rambouillet ewe for half-blood wool and a larger sheep we breed a Cotswold buck. We take one cross of the Rambouillet-Cotswold and cross right back with the Rambouillet.

Commissioner CULBERTSON. You get a comeback sheep in that way?

Mr. RUMSEY. Yes. We try to keep it about there.

Commissioner CULBERTSON. Have you tried the Corriedale?

Mr. RUMSEY. Some men have. I have not. I have examined them carefully and am very much pleased with them.

Commissioner CULBERTSON. Do you find that the Comeback sheep holds to type?

Mr. RUMSEY. Not always; but I think generally.

Commissioner CULBERTSON. How far apart are your summer and winter ranges?

Mr. RUMSEY. From 100 to 125 miles.

Commissioner CULBERTSON. Are the trails still open?

Mr. RUMSEY. Yes; but I tell you we all get "up against it." We are gradually buying ranches—putting in our profits for years in order to preserve our sheep business. I bought one the other day that cost $105,000.

Commissioner CULBERTSON. What conditions forced you to buy that land?

Mr. RUMSEY. The need of raising feed to protect the sheep in a drought or in winter.

Commissioner CULBERTSON. What proportion of the year do you feed your flocks?

Mr. RUMSEY. We usually begin about December 20. Two years ago, when winter was nearly over, we lost $100,000 worth of sheep. I know of other men in the Rock Springs lease that lost over $300,000, and the average loss was 40 per cent.

Commissioner CULBERTSON. From what causes?

Mr. RUMSEY. From a five-day blizzard, beginning the night of April 10. I had seven carloads of feed along the road to the Rock Springs lease and we could not get any of it to the sheep. I had been working up to the point I had reached for years, and it will take me four years to get that outfit back to its former condition. The result is that the building of warehouses in the center of the winter range, where we could stock up with feed and save the sheep in the hour of peril, is being seriously considered. Of course, that increases our expenses. The summer range, once free, now costs us 7½ to 9 cents a head, lambing included.

Commissioner CULBERTSON. Have you built any warehouses?

Mr. RUMSEY. Yes, sir.

Commissioner CULBERTSON. The homestead act has not caused you any serious difficulty here?

Mr. RUMSEY. It hasn't right in this locality, but in the Brown Hill country it has.

Commissioner CULBERTSON. What is the solution of the land situation in this locality? In some places I have found that the sheepmen are favorable to the extension of the forest reserve principle to the public land.

Mr. RUMSEY. I can only see that it will tax the sheepmen more and that the Government will get more. They can not district it out, because this land outside the forest reserve is very poor and the feed varies each year.

Commissioner CULBERTSON. What feed do you produce on irrigated farms in this locality?

Mr. RUMSEY. Alfalfa hay. We have alfalfa meal, which is 60 per cent molasses, and cottonseed oil cakes. Many prefer corn.

Commissioner CULBERTSON. What are you paying for hay now?

Mr. RUMSEY. $27 per ton f. o. b. Saratoga. It costs $32 laid down at the warehouse on my winter quarters.

Mr. NORLITT. From 1908 to 1911, on the average, it did not exceed $8 on the car.

Commissioner CULBERTSON. How much do you pay your herders now?

Mr. RUMSEY. They average $100 a month. In 1910 we paid $40 or $45.

Commissioner CULBERTSON. Where do you market your lambs?

Mr. RUMSEY. At Denver and Omaha, principally Omaha. We frequently sell to Colorado feeders.

Commissioner CULBERTSON. About what per cent of lambs do you mark up?

Mr. RUMSEY. We mark up as high as 83 per cent in a good year. The summer lamb losses are usually quite heavy.

Commissioner CULBERTSON. You do not have expensive lambing sheds like those around Boise?

Mr. RUMSEY. No; we have natural protection on the range.

Commissioner CULBERTSON. Do you hand shear or machine shear?

Mr. RUMSEY. I used to have a steam plant, but hand shear now, as we found this climate was too severe to cut so close.

Mr. PECK. Mr. Rumsey spoke about including land under the forest reserve and making it more expensive for the sheepmen. In Colorado there has been opened up a range which was never used before for over 100,000 sheep. I think that should be taken into consideration.

Mr. RUMSEY. I meant the constantly increasing cost of running sheep. For years we did not pay anything to go on the national forest, and now they have doubled the price. I was not finding fault. I think the national forest is one of the best things that ever happened.

Mr. PECK. When we opened up that land we really extended the industry there.

Mr. RUMSEY. Yes; and just about saved the sheep industry of Carbon County.

STATEMENT OF MR. I. J. RENDLE, OF RAWLINS, WYO.

Commissioner CULBERTSON. Where do you run your sheep?

Mr. RENDLE. In summer in Colorado National Park and in fall and winter about 20 miles north of Rawlins.

Commissioner CULBERTSON. Do you have any difficulty trailing?

Mr. RENDLE. No, sir.

Commissioner CULBERTSON. Do you have ranches?

Mr. RENDLE. No. We run entirely on winter range land. We own every other section.

Commissioner CULBERTSON. Does that practically give you control of the Government sections, too?

Mr. RENDLE. No, sir.

Commissioner CULBERTSON. Have cattle interfered with the sheep business on those lands?

Mr. RENDLE. Yes. The cowmen use the range as though we didn't own every other section. Their cattle roam about and are not molested.

Commissioner CULBERTSON. What is the basis of your flocks as to breeds?

Mr. RENDLE. Rambouillet. I feel that we can not get too far away from the Merino base in this country, because the sheep herd and handle so much better.

Commissioner CULBERTSON. Do you place the greater emphasis on mutton or wool?

Mr. RENDLE. There has been more emphasis on lambs since 1914 and 1915.

Commissioner CULBERTSON. What equipment have you on your summer range?

Mr. RENDLE. Three men to two herds, with saddle and pack horses, when we go into the mountains, but as soon as we get out of the reserve we go back to our wagons.

Commissioner CULBERTSON. About what investment have you in summer equipment per camp?

Mr. RENDLE. About $300, including the value of the horses, pack saddles, tents, and miscellaneous equipment. It is very small in the mountains but is easily destroyed, and the upkeep is heavy.

Commissioner CULBERTSON. Do you find that the Con[illegible] r band type?

Mr. RUMSEY. Not always; but I think generally.

Commissioner CULBERTSON. How far apart are [illegible] the summer ranges?

Mr. RUMSEY. From 100 to 125 miles.

Commissioner CULBERTSON. Are the trails st[illegible] en?

Mr. RUMSEY. Yes; but I tell you we all g[illegible] you in land? ually buying ranches—putting in our profit [illegible] value. sheep business. I bought one the other d[illegible] g count?

Commissioner CULBERTSON. What con[illegible]

Mr. RUMSEY. The need of raising [illegible] Mr. Rendle, over a in winter.

Commissioner CULBERTSON. Wh[illegible] from 8 to 10 per cent. flocks?

Mr. RUMSEY. We usually b[illegible] from predatory animals and winter was nearly over, we [illegible] in the Rock Springs lease [illegible] years. per cent. [illegible] type of labor do you use?

Commissioner CULB[illegible]

Mr. RUMSEY. Fro[illegible] Is it efficient? had seven carload[illegible] very unreliable. could not get an[illegible]

[illegible] CULBERTSON. Was 1918 or 1919 the most profitable year for had reached fo[illegible] its former c[illegible] 1918. center of t[illegible]

[illegible] CULBERTSON. What is the present situation as to the sale of sheep in [illegible] locality? creases [illegible] I think it is good in regard to price or ready sales. a hea[illegible]

[illegible] CULBERTSON. How long have you been in the industry here?

C[illegible] RENDLE. About 19 years.

[illegible] Commissioner CULBERTSON. Looking back, would you say that the industry has been prosperous?

Mr. RENDLE. Yes, sir.

Commissioner CULBERTSON. What factors are coming in to arrest its development in the future?

Mr. RENDLE. The 640-acre homestead act, the taking up of land and water holes on the desert, where previously in the summer no one ever thought of running sheep, has resulted in cutting down our winter range to a great extent.

Commissioner CULBERTSON. You are having trouble with water on your winter range?

Mr. RENDLE. The little water holes have been taken up, and they are now using feed in summer that up to five years ago was left for winter, on account of not being able to get all of their sheep on to the national forest.

Commissioner CULBERTSON. You are gradually protecting yourself by purchasing lands?

Mr. RENDLE. It is now impossible to purchase any more land in blocks that will do any good. The railroad land has all been purchased.

Commissioner CULBERTSON. Does purchased land represent a permanent basis for the industry?

Mr. RENDLE. In a way, but we are still up a tree, with every other section inside the railroad land.

Commissioner CULBERTSON. What would be the most satisfactory way of handling these Government sections?

ᴺᴰᴸᴱ. I would like to see them put out at a small rental so that we
and fully protect them.
ner CULBERTSON. You would prefer leasing these lands rather
the forest-reserve principle?
would not want them under forest supervision.
ᴸᴮᴱᴿᵀˢᴼᴺ. What are the chief forage plants for sheep in the

ll submit a list of them.
as follows:)
Hayden and Routt Forests.—Grasses: Fescues, red-
s, wheat grass, brome (wild oats), grama, timothy.
ld parsnip, bluebell, gentians, urn flowers, colum-
n, chokecherry, oak, rabbit brush, sagebrush,
, marsh marigold, geranium, larkspur, brier-

ᴿᵀˢᴼᴺ. Are sheep losses due to physical difficulties over
control, or to bad judgment?
. Part of them are due to poor judgment. A Forest Service man
says that he told some men who were in charge of sheep up north
here was black alkali there. The sheepmen said they knew what to do,
ut, nevertheless, they lost practically the entire band.

Commissioner CULBERTSON. That same criticism would apply to these large losses due to failure to get feed to the sheep on the winter ranges, would it not?

Mr. WILSON. Yes; but sometimes it is physically impossible to get it to them. At one time, we had an abundance of feed within 9 miles of camp, and for five days we couldn't see to move a team in that direction. To have your feed within 9 miles is supposed to be very good. I think losses on the forest reserve in the mountains are impossible to overcome, as it is hard to tell when they are going to occur.

Commissioner CULBERTSON. Do sheep ever freeze to death on the range?

Mr. RENDLE. I think a great many of them do when they become thin. Fat sheep never do.

Mr. DALEY. Mr. Rendle stated that the land which is in the "checker board," lying between the railroad sections he purchased and within what we call the railroad land grants, he would not want to see handled by the Forestry Department. He also favored leases under a low rental. I would like to ask if he would favor purchase on a long-time payment basis, say 18 years, at low rates of interest?

Mr. RENDLE. Yes; I would.

Commissioner CULBERTSON. How much did you pay per acre for your land?

Mr. RENDLE. In 1906 and 1907 we paid 50 cents an acre for 48,000 acres within the railroad grants.

Commissioner CULBERTSON. For what are such lands purchased now?

Mr. RENDLE. The last land sold directly by the Union Pacific brought as much as $2 an acre.

Commissioner CULBERTSON. Are these the usual prices paid?

Mr. DALEY. The prices varied from 50 cents to $3 an acre for land west of the Platte River and east of Bitter Creek.

Mr. WILSON. Is an acre of that equal to an acre of forest-reserve land for running sheep?

Mr. DALEY. No; the ratio is about 1 to 6; that is, 6 acres of this land to 1 acre on the forest reserves.

Commissioner CULBERTSON. How many acres per sheep?

Mr. RENDLE. About 5 acres. We feed six months.

Commissioner CULBERTSON. What is the carrying capacity of the national forest?

Mr. PECK. It varies in different localities. We figure one sheep to a couple of acres on the average.

Mr. DALEY. I would like to ask Mr. Rendle if, when he purchased this railroad land, the fact that he got the Government land free influenced him in any way?

Mr. RENDLE. I do not think we would have bought the railroad land if we had not gotten the Government sections.

Mr. RUMSEY. The Railroad Company used that as an inducement.

Commissioner CULBERTSON. Do you consider the price paid to be reasonable?

Mr. RUMSEY. No; I paid 50 cents for a great deal of land which had been offered here at 20 cents.

Commissioner CULBERTSON. What is the general feeling about the price at which this land was sold?

Mr. DALEY. I would say that the first 75 per cent was sold at a fairly reasonable figure, and the last 25 per cent was too high.

STATEMENT OF MR. A. R. STRATTON, OF RAWLINS, WYO.

Mr. STRATTON. I live in Rawlins, and run 25,000 sheep in the Routt Forest in summer and on the Red Desert in winter.

Commissioner CULBERTSON. How much land do you control for your winter range?

Mr. STRATTON. Between four and five townships, alternate sections, located north and south of Wamsutter. I do not know the exact acreage.

Commissioner CULBERTSON. Have you reached an organization where you can protect the industry and go ahead in the future?

Mr. STRATTON. Only to a very limited extent.

Commissioner CULBERTSON. What uncertain factors are there to-day which are likely to interfere with its development?

Mr. STRATTON. The 640-acre homestead act and the general trend of legislation.

Commissioner CULBERTSON. Have you had trouble with the 640-acre homestead act?

Mr. STRATTON. Yes; and with the 320, and the 160.

Commissioner CULBERTSON. Was that trouble over the land between your summer and winter ranges?

Mr. STRATTON. Yes; on our lambing ground and fall ranges.

Commissioner CULBERTSON. Have any of these homesteads become permanent, or are most of them abandoned?

Mr. STRATTON. One gets out and another comes in. The idea, apparently, is to graft a living. I have watched them ever since they came and have never seen a crop raised yet.

Commissioner CULBERTSON. Do they sell their land to the cattlemen or the sheepmen?

Mr. STRATTON. They have never been able to get enough done to prove up title and sell out.

Commissioner CULBERTSON. What is the best solution of the public land problem in this locality?

Mr. STRATTON. I would rather see it leased or passed into private ownership by being sold on easy payments.

Commissioner CULBERTSON. What per cent of your income is from wool?

Mr. STRATTON. From 1910 to 1913 we received a little more from the sale of sheep and lambs than from wool. Since then, with the exception of 1917, I have gotten twice as much from the sale of sheep.

Commissioner CULBERTSON. Then, you are gradually placing more emphasis on the lambing side of your business?

Mr. STRATTON. We are breeding for bigger sheep and coarser wool. We are raising about as much wool per head as ever, but a different grade.

Commissioner CULBERTSON. Have you anything to say on the question of losses?

Mr. STRATTON. Our summer losses are the heaviest, caused by straying, by coyotes and other predatory animals on the reserve; also by poison.

Commissioner CULBERTSON. What is the Government doing, Mr. Peck, with regard to eliminating predatory animals?

Mr. PECK. The Biological Survey has taken full charge of that campaign. The forest rangers do all they can in the way of trapping, etc.

Commissioner CULBERTSON. Has the Australian system of grading and classing been tried at all?

Mr. STRATTON. It is satisfactory with the ones that follow it.

Commissioner CULBERTSON. Mr. Smiley, what led you to adopt the Australian system?

Mr. SMILEY. We found we could sell graded and classed wool a little better.

Commissioner CULBERTSON. How many grades do you put out?

Mr. SMILEY. We skirt the wool. Instead of rolling the dirt and everything up in the fleece we keep that by itself.

Commissioner CULBERTSON. The increased price for the main body of the fleece more than compensates you?

Mr. SMILEY. We received a little more for Australian classed wool than for wool not classed that way.

Commissioner CULBERTSON. Do you sell direct to the manufacturers?

Mr. SMILEY. We have a commission house of our own in Boston. They sell it to manufacturers, not to dealers. We grade it ourselves.

Commissioner CULBERTSON. About how large a clip do you have per year?

Mr. SMILEY. From a hundred to a hundred and fifty thousand pounds.

Commissioner CULBERTSON. Is there anyone else here who uses the Australian system?

Mr. BIBLE. I am a director of the Cow Creek Sheep Co., the Leo Sheep Co., and the Sandston Sheep Co., in each of which we use the Australian system.

Commissioner CULBERTSON. Is there a disposition in those companies to continue the method?

Mr. BIBLE. Yes, sir.

Commissioner CULBERTSON. What system do you use in selling your wool, Mr. Stratton?

Mr. STRATTON. We ship on commission, or sell here when the price is satisfactory to the grower; if not, it is consigned.

Commissioner CULBERTSON. Is that system of marketing wool satisfactory?

Mr. STRATTON. No; but it is about the only one we have. As a general thing, if we consign it, we do not do any better.

Commissioner CULBERTSON. Have you any suggestions to make as to improvements in marketing wool?

Mr. RUMSEY. Auction sales; sealed bids.

Commissioner CULBERTSON. Have you had auction sales in this locality?

Mr. STRATTON. No; but we have run sealed-bid sales, which were not any more satisfactory than private sales.

Commissioner CULBERTSON. Are you interested in the National Wool Warehouse at Chicago?

Mr. STRATTON. I have been interested three or four times. It was about the poorest commission firm in the country.

Commissioner CULBERTSON. Is anyone here using that medium of marketing their wool?

Mr. ESPY. The Blake Sheep Co. uses it.

Mr. RENDLE. The Rendle Sheep Co. does.

Mr. RUMSEY. I use it. The Carbon County Sheep Co., the Daley Sheep Co., the Murray & Mackay Sheep Co., the Kindt Sheep Co., John Mahoney, and the Rasmussen Sheep Co. use it.

Commissioner CULBERTSON. I gather that it is quite generally used in this locality.

Mr. STRATTON. Some are satisfied with it and some are not.

STATEMENT OF MR. RAY PECK, OF STEAMBOAT SPRINGS, WYO.

Commissioner CULBERTSON. Of what forest are you the supervisor?

Mr. PECK. For two years I have been supervisor of the Routt National Forest, in Moffat, Routt, Jackson, and Grand Counties, Colo. Before that I was deputy supervisor, and have been acquainted with conditions in the forest for 11 years.

Commissioner CULBERTSON. Will you discuss the development of the sheep industry with reference to the forest?

Mr. PECK. The lower portions of the forest were used quite extensively for cattle and sheep ranges, and the very high ranges—the timbered and rough sections—were not. At that time there was considerable local opposition to sheep, but largely through the efforts of the Forest Service and the association here sheep were introduced into Routt Forest. The Hayden Forest was pretty badly overgrazed. Consequently Routt Forest was used to take care of the surplus. In 1909 we started in gradually with something like 15,000 head, which we have gradually increased to about 115,000.

Commissioner CULBERTSON. Is that the maximum capacity?

Mr. PECK. Very nearly so. Of that number, something like 5,000 are locally owned, and the remainder are Wyoming sheep.

Mr. DALEY. Do you mean the maximum capacity of the range is reached or the capacity of the range open for sheep?

Mr. PECK. The sheep range. The forest is all in use now by either sheep or cattle, while formerly a large portion of it was not.

Mr. DALEY. If the present limits of the reserve were extended, then the sheep there now would not represent the maximum capacity of the whole range?

Mr. PECK. Not if we took in lands that are not fully utilized by cattle. There may be some areas more profitable for sheep range than cattle range.

Commissioner CULBERTSON. Is not the most efficient use of the range brought about by a combination of cattle and sheep?

Mr. PECK. It depends on the type of range. Sheep do not eat wet meadow grasses in the high country. They range more on weeds and browse. Wherever we have meadow land commingled with the weed type, it is more profitable to

run both kinds of stock, providing that can be worked out with the permittee. It does not pay very well to run antagonistic permittees on the same area. If one man owns sheep and cattle, they get along pretty well.

Commissioner CULBERTSON. Do you have an advisory board of sheep and cattle men?

Mr. PECK. Yes, sir.

Commissioner CULBERTSON. Will you describe that system of cooperation?

Mr. PECK. The cattle range on Routt Forest is divided among eight associations. Each appoints an advisory board of three to five members to confer with forest officials on the management of the range.

Commissioner CULBERTSON. Do you consider that the sheep industry is beneficial to the conservation of forests?

Mr. PECK. We have had no serious fires since the high country has been grazed. Formerly, when feed dried up in the fall, it was often waist high and very inflammable. The presence of the sheepmen in the forest proves of great benefit. The herders are very careful about fires, and either notify the forest officers about them or put the fires out. We have received an immense amount of cooperation along those lines.

Commissioner CULBERTSON. Have you found it necessary to cut down the larger permittees on account of applications from Class A men?

Mr. PECK. Not in the sheep business. We have cut down the large cattlemen for the sake of the small, and that might eventually happen to the sheep industry, provided the local industry was built up.

Commissioner CULBERTSON. Will you state the prices which you charge for grazing sheep in the forest?

Mr. PECK. I have this statement:

Grazing fees in Hayden and Routt National Forests.—Sheep: May 5 to September 30, lambing season, 12 cents; May 5 to October 10, lambing season, 13 cents; June 16 to September 30, 9¾ cents; July 1 to September 30, 8¼ cents. Additional for lambing, 2 cents per head.

Mr. DALEY. If the amount of territory allotted to sheep has increased—and the number of sheep has been increasing since Routt Forest was opened—how is that increase taken care of?

Mr. PECK. By opening new territory along the top of the range. A good deal of the extension was made against local opposition. The cattlemen had been allowed certain ranges, and consequently claimed them, even though they were not using the range to capacity. We considered the high range inaccessible for cattle; besides, there were too many flies. Possibly the demand for cattle range was not as great then as now. It all depends on how badly they want a range. For instance, Mr. Turrell grazed a bunch of cattle along with his sheep on top of the Continental Divide near Mount Ethel, which is one of the highest courses in the forest—over 11,000 feet.

Mr. PETRIE. You can put cattle at an altitude of over 11,000 feet, but you can not keep them there.

Mr. PECK. Yes; they herd the cattle there. They do not turn them loose as they ordinarily would.

STATEMENT OF MR. JAMES BLACKHALL, ENCAMPMENT, WYO.

Commissioner CULBERTSON. What is your address, Mr. Blackhall?

Mr. BLACKHALL. Encampment, Wyo.

Commissioner CULBERTSON. And you are supervisor of what forest?

Mr. BLACKHALL. Of the Hayden Forest, in Carbon County, Wyo., and Jackson County, Colo.

Commissioner CULBERTSON. How long have you been on that forest?

Mr. BLACKHALL. Fifteen years.

Commissioner CULBERTSON. I wish you would discuss the sheep industry with reference to that forest.

Mr. BLACKHALL. The Hayden Forest range is very badly overcrowded with sheep. The first year, 1905, we gave permits to everyone who asked for them. We admitted about 320,000 sheep. The next year we made two or three different cuts to get the sheep down to the carrying capacity. We allotted the range so they could feed there in the summer as long as possible.

Mr. DALEY. How were the cuts made?

Mr. BLACKHALL. The larger the outfit the larger the cut. We started with 30 per cent and scaled down to 10 per cent on the smaller outfits. We made no cuts under the protective limit, which was 1,500 head.

Mr. RUMSEY. Were the men having allotments permitted to make the improvements necessary to carry on the business?

Mr. BLACKHALL. Yes; that was to stop trailing around.

Mr. PECK. The sheepmen have developed allotments by building trails and bridges.

Mr. BLACKHALL. They built half of the Battle Creek bridge, but we built the rest of the bridges and trails. We have an appropriation and spend a little money each year opening up trails. Most of our creeks are bridged now. Formerly, a sheepman would throw down a couple of trees and put a little mud between, and cross over, and then hitch his horses to this temporary bridge and pull it out. Hence it was necessary for each fellow to build his own.

Mr. RUMSEY. Those allotments have permitted the sheepmen to build cabins and corrals, etc.

Mr. BLACKHALL. I think all of them should build improvements, but not very many have done so. They generally appropriate some old mining shack for headquarters. They built some corrals on the Savery Trail last summer.

Commissioner CULBERTSON. Are the charges for grazing on that forest the same as on the other one?

Mr. BLACKHALL. Just the same. The two forests are really run together.

Mr. DALEY. You have not stated how the sheep enter the forest in the spring.

Mr. BLACKHALL. We found out that the sheepmen would come in a bunch, and the trails became so congested that we figured out a schedule, allowing two bands through in the morning and two in the afternoon. Then we made a list and put down certain days for each outfit, so the corral would not be crowded. That worked out very well. Now we have a schedule like the railroads. A band of sheep is supposed to pass from the corral to Stemp Springs by noon, to make Battle Creek by night, and be to the school section the next day.

Mr. RUMSEY. Our sheep range in southern Wyoming and northern Colorado in the summer, and when we pass to the forest reserve the authorities in Routt County assess us a year's taxes in addition to the year's taxes that we pay here. We have to be there three or four months and pay double taxes, and yet we are on the Government forest reserve. That is one of the sources of increased expense.

Mr. DALEY. Have any steps been taken to designate the trails leading up to the forest?

Mr. BLACKHALL. Yes. In anticipation of this 640-acre homestead act we, together with the advisory board, made up a set of trails showing how to get

from the winter ranges to the forest. We have sent that in, and I believe that the trails have now been partly designated. They did not make them as wide, however, as some of the sheepmen desired. Mr. Boyer, of Rock Springs, wanted a trail about 10 miles wide, which was rather unreasonable. I do not know whether that trail has been designated or not.

Mr. DALEY. Were not the trails asked for by the sheep owners about 2 miles wide in open territory, and in the ranch section, in some instances, drawn down to a mile in width?

Mr. BLACKHALL. Yes; it was boiled right down to lanes.

Mr. DALEY. Has there been land taken up across a trail that was previously asked for?

Mr. BLACKHALL. I have no definite knowledge of the situation outside the forests, but I believe there has been land taken up on Browns Hill. There are lots of applications pending for lands that have been withdrawn for trails.

Mr. DALEY. If those applications are accepted by the Government, what effect would that have on getting the stock from the winter to the summer range on the national park?

Mr. BLACKHALL. It would block the trails, and the sheepmen would have to get together and buy a right of way.

Mr. DALEY. Since the advisory board and the forest officials went over this matter some lands have been taken up that we had asked the Interior Department to designate as trails. This has seriously hampered trailing, especially in the Browns Hill section.

Commissioner CULBERTSON. Does the sheepman have to pay any fee for trailing over these designated trails?

Mr. BLACKHALL. No.

Commissioner CULBERTSON. There is no regulation as to what flocks shall pass over them?

Mr. BLACKHALL. Anyone can go over them.

Mr. WILSON. Is there not some regulation about the number of miles they shall travel per day?

Mr. RUMSEY. I do not think that has been enforced.

Mr. WILSON. I think that was 6 miles for dry sheep and about 3 miles per day for ewes and lambs.

Mr. DALEY. You will understand that throughout the State settlers have taken land under the 640-acre homestead act more for the purpose of obstructing the trails than of using them for bona fide purposes.

Commissioner CULBERTSON. Can they take a homestead after a trail is designated?

Mr. DALEY. I understand not; but they have taken up land on trails that had been used for years for the purpose of selling later.

Mr. NOBLITT. That practice extends to the lambing grounds on the public range. It seems to be the general idea that the nearer to a lambing ground you can make a 640-acre homestead entry the more valuable it is.

STATEMENT OF MR. JOHN D. NOBLITT, OF COKEVILLE, WYO.

Commissioner CULBERTSON. Mr. Noblitt, where do you live?

Mr. NOBLITT. At Cokeville, Wyo., in the southwest corner of the State.

Commissioner CULBERTSON. How many sheep have you there?

Mr. NOBLITT. Our winter outfit consists of nine to ten thousand.

Commissioner CULBERTSON. Will you make a general statement of conditions there?

Mr. NOBLITT. The sheepmen of the southwestern part of the State have been reducing their flocks. I made a list of the numbers and outfits that have been sold and the extent to which other outfits have been reduced, and I reached the conclusion that the reduction for the last five or six years on account of extreme drought was about 30 per cent; a reduction of about 10 per cent is being made generally. There is nothing like the number of small flocks of five, six, or seven years ago.

Commissioner CULBERTSON. Has there been a tendency toward larger flocks?

Mr. NOBLITT. No. The larger outfits have all reduced and the smaller could not make the business pay.

Mr. DALEY. What do you consider a small outfit?

Mr. NOBLITT. A small outfit is the number for which the Forestry Department will issue a grazing permit for class A beginners—600 head of sheep.

Commissioner CULBERTSON. Do you approach Idaho conditions or conditions in this locality?

Mr. NOBLITT. As I understand the Idaho conditions immediately west of us, we are about between the two propositions. We do not run as many tight-wool or Merino-Rambouillet sheep as in Rawlins, Carbon, and Sweetwater Counties. Mutton sales are materially in advance of wool sales, especially since the tariff was taken off from wool and wool products, frozen meats, etc.

Commissioner CULBERTSON. You figured that you could exist whether there was a tariff on wool or not?

Mr. NOBLITT. We could come nearer existing. Our outfit has been running black faces, whether Hampshires or any other type, and one herd of Rambouillet bucks or Merinos and one herd of Lincolns and Cotswolds. We run the black faces, knowing that though they will reduce the quantity and quality of our wool, they will increase the quantity and quality of our mutton. The Rambouillets keep up the quality and type of sheep necessary for the ranges. In doing that we created certain type of ewe upon which we can run the Lincoln and Cotswold bucks and not seriously hurt the mutton or the wool branch of the industry. That requires very careful grading, and I know of no way in which a one-herd outfit could accomplish it unless they separated and graded their ewes during the breeding season.

Mr. DALEY. Do you keep some ewe lambs from the black-face Merino cross?

Mr. NOBLITT. Our practice is not to keep anything that has a black hair, because the blackface, as a breed, is a strictly mutton type. We did, however, keep a few hand-picked, cross-bred black faces out of our half-bred Cotswold-Rambouillet ewes and Hampshire bucks for experimental purposes, to see whether or not the wool would hold up, etc.

Commissioner CULBERTSON. Would you say that the black-face cross is not adapted to range conditions, from a financial point of view?

Mr. NOBLITT. Only for the sake of creating mutton at a time when mutton is the leading part of our business and wool a by-product.

Mr. RUMSEY. What caused you to make that cross?

Mr. NOBLITT. The anticipated lower price for wool. Since 1912 or 1913 we have considered wool a by-product and have emphasized ranging a breed of sheep that would sell to the best advantage as five or six months' lambs.

Commissioner CULBERTSON. Is the type you have developed adapted to the whole of Wyoming?

Mr. NOBLITT. Local conditons have certain bearings on the situation, and no one can speak entirely for other communities.

In our district it is necessary to have range sheep that can not only stand storms and be handled in herds, but will yield a profitable amount of wool or

lambs. We have endeavored not to get far from either, so that we would not have too far to go in order to refit ourselves.

The outfit in which I am interested, and that of the majority of my neighbors, has more money tied up in land than in sheep. Some have more money in winter range alone than in all of their sheep, to say nothing of the necessary ranches, water holes, lambing grounds, and fall ranges.

Our outfit has approximately 10 acres of winter range for every sheep sheared, that range costing us an average of $1.10 an acre about 12 years ago. It has changed hands recently at $1.25 per acre, and this year we are being assessed by the State board of equalization on a $2 valuation.

Commissioner CULBERTSON. Is that land adapted to any other use than grazing?

Mr. NOBLITT. I think not.

Regarding depreciation, we find it necessary in order to keep up our breeding outfit to add a number of ewe lambs every year, equal to about 25 per cent of our sheep holdings. If you buy or raise them, it is equal every fall to one-quarter of your present investment. In 1917 it cost us $6.63 per head to run our sheep and $6.53 in 1918. This was based upon the number sheared and did not take into account the depreciation just referred to.

Commissioner CULBERTSON. Do you have a cost-accounting system?

Mr. NOBLITT. We are a corporation and every year render a balance sheet to our stockholders from these detailed records.

Commissioner CULBERTSON. Suppose you lose 500 sheep from poisonous plants; how do you handle a loss of that kind?

Mr. NOBLITT. We would keep a record but would not attempt to weave that into the dollars and cents estimate of expense, for this reason: We either save the ewe lambs or go to market and buy enough to replace them, and that purchase is shown in the general report under a sheep-purchase item.

Commissioner CULBERTSON. It really amounts to a charge against the capital rather than the running expenses?

Mr. NOBLITT. Yes.

Mr. RUMSEY. Is that not a revaluation of the outfit?

Mr. NOBLITT. It would be, only we keep the number of ewe lambs raised equal to the number lost. We raise all our ewe lambs, and do not buy as some of our neighbors do.

We have not used the Australian system of wool grading in our district. We believe that throwing our grades into six or seven classes is more in line with the requirements of our buyers at this time than the complicated Australian system with at least 14 classifications. However, we are drifting in that direction.

We have not had much success with cooperative sales of wool. Our impression is that buyers oppose it because it would compel them to compete with one another.

Commissioner CULBERTSON. Has the tendency toward improved grading been brought about by a demand from the manufacturers?

Mr. NOBLITT. It was brought to the producer through the efforts of the National Wool Warehouse & Storage Co., an organization largely created by the sheepmen.

Commissioner CULBERTSON. Does that company find favor in your locality?

Mr. NOBLITT. Considerably so. Since it came into existence our own outfit has shipped to it about three years out of five, and our only regret is that we have not shipped them our wool every year.

Mr. RUMSEY. Is not the grading of wool by either the American or Australian system done for the purpose of letting the woolgrower know the value of different grades and hence helping him to get better values?

Mr. NOBLITT. That has been the effect.

Mr. RUMSEY. American manufacturers tell the woolgrowers that they do not want firsts and seconds of Nos. 1, 2, 3, 4, and 5; but that they want all of it numbered 1, 2, 3, 4, and 5. The Australian people make firsts and seconds, and so forth, through the 14 classifications.

Mr. NOBLITT. You asked in the questionnaire No. 11:

"What management of the public lands would give the most aid to the sheep industry? Would such management of the public lands retard the development of the State by keeping out settlers?"

My answer to the first part of that question is: State control and State leasing of public lands, with general classifications, so that settlers could secure all lands adapted to settlement, but not be permitted to take grazing lands indiscriminately for the purpose of coercing the stock growers into buying it or paying unreasonable fees for its use.

Commissioner CULBERTSON. Who is to be the judge of whether these lands are fit for homesteading?

Mr. NOBLITT. The Federal department considers that the applicant, who is generally not qualified, should be the sole judge.

I am not opposed in any way to the settlement of the country and sincerely sympathize with settlers who have been induced to take up this land and expend money on it.

Commissioner CULBERTSON. Do you think there should be a classification of these lands, designating grazing lands, and those for settlement and agriculture?

Mr. NOBLITT. Yes, sir. At present an inspector is sent out in the districts. He may not leave the railroad station or the automobile road, but on return renders a report that all the land paid for should be designated under the 640 or 320 acre homestead acts.

Commissioner CULBERTSON. Can anyone who wants a piece of land for homesteading get it?

Mr. NOBLITT. I would go across the State to see an inspector who had not passed all lands.

Mr. WILSON. The usual method of designating is about this: If we make application in one of these townships it is designated without any examination whatever. When we prove up on the 320 acres, we can then make application for an additional 320 within 20 miles. There was a question of legality, but the Interior Department decided that a settler was entirely within his rights when he took an additional 320.

Commissioner CULBERTSON. Is the land problem the greatest factor of uncertainty in the sheep business?

Mr. NOBLITT. Yes, sir. If all the lands applied for in my part of the country had been designated 60 per cent of the sheep regularly run there could not have been lambed last spring. The department temporarily postponed designations during the war. In the last few months in some cases, over half of the area heretofore used as lambing grounds has been designated in these 640-acre applications, so the sheepmen have either got to buy or hire those rights from the settlers. In my judgment there is no 640-acre homestead tract of land left in the State of Wyoming upon which a man could make a decent living for his family.

Mr. WILLIAM DALEY. Don't some of these fellows who take up homesteads apply to you for employment or for a grub stake?

Mr. NOBLITT. They sometimes apply to us for a remittance.

Now, with regard to your question:

Which would be worth more to you, 8 cents more per pound for your wool clip or 2 cents per pound increase (average for the year) in the price of market lambs?

We figured on a five-year basis and found that the average was in favor of an increase in the price of mutton.

Commissioner CULBERTSON. What have been the two most profitable years since 1910?

Mr. NOBLITT. For my own outfit, 1915 and 1916.

Commissioner CULBERTSON. And the worst years?

Mr. NOBLITT. 1919 and 1917, because of an extremely hard winter.

Commissioner CULBERTSON. Was 1918 a more profitable year than 1919?

Mr. NOBLITT. Yes. We had less expense.

Commissioner CULBERTSON. How high can the value of land go and you remain in the sheep business?

Mr. NOBLITT. We have been putting so much money in lands for the last few years that we do not know whether we are broke to-day or going to be broke a few years from now. That depends upon the prices we are able to get. We need some protection that will keep our prices up in proportion to other prices and the continued advance in land.

Mr. RUMSEY. Is it not true, in this severe climate, that we can not carry a sheep to the age that they can in milder climates?

Mr. NOBLITT. We are compelled to sell our ewes a year or two younger to the so-called one-year breeder back East at a price very much below that for a prime ewe at home.

Mr. RENDLE. Which is the longest-lived sheep, the mutton or the wool sheep?

Mr. NOBLITT. The wool sheep lives approximately one to two years longer.

Mr. RUMSEY. Being forced by free wool to the mutton type, the life of the sheep is lessened. The mutton sheep can not live as long as the wool sheep.

Commissioner CULBERTSON. If there was a high duty placed upon wool, would you return to the wool flock exclusively?

Mr. NOBLITT. Not exclusively, for our ranges are better adapted to the medium grade of sheep and we would have absolutely no assurance that conditions would remain on that basis.

Commissioner CULBERTSON. Regardless of legislation, you are likely to maintain a balance between mutton and wool?

Mr. NOBLITT. We will anticipate changes in legislation as far as we can.

For the year 1919, by estimating the actual expenses up to the 1st of October and anticipating actual expenses for the balance of the year, our expense per head for running sheep would be $1.80 more than in 1918. That does not include buying any unusual amount of feed for a hard winter.

The sheep men of the southwestern and western part of this State winter 100 miles from where they lamb, and summer 80 to 100 miles on the other side. We either ship from the winter range and from the lambing ground or trail. These trails, however, have been so taken up and narrowed down that in the fall and spring we frequently are compelled to buy feed. We frequently ship because otherwise we would have to haul out feed.

Commissioner CULBERTSON. Do you consider the prospects for the industry favorable in your locality?

Mr. NOBLITT. There is no opportunity to enlarge the business under present conditions unless the public-land question is adjusted.

Commissioner CULBERTSON. Do you think the industry can endure if you have to ship from the summer to the winter range?

Mr. NOBLITT. That, again, depends upon prices. This shipping is due to the fact that the open range has been taken up. Trails 15 miles wide are sometimes reduced to 60 feet. In other places you have to hire the privilege of crossing.

STATEMENT OF MR. J. M. WILSON, OF McKINLEY, WYO.

Commissioner CULBERTSON. Mr. Wilson, I would be glad to have you discuss this problem in your own way.

Mr. WILSON. I would just like to say, in regard to the stability of the sheep business, that the most reckless Wall Street gambler is a piker compared to the Wyoming sheepmen, because the gambler nearly always holds some reserve, but the sheepman puts up every penny. If the weather is against him, he is bound to face very material losses.

Sheds are most dangerous, because the snow whirls around, covers them, and smothers the sheep. That was tried in the old days in the eastern part of the State. You can not tell how severe these blizzards are going to be, and when the sheep are caught out there is no way on earth to protect them.

Commissioner CULBERTSON. Are storms general or the exception?

Mr. WILSON. They are the exception. We have had blizzards in April. We had a band of 3-year-old wethers out in a blizzard. They crossed a creek and got up on a hill behind one of these little pinnacles, which broke the wind completely; but the lead turned back, and out of 3,000 sheep we had a pile of over 2,000. The herder wasn't to blame for that. That is one of the conditions that the books don't show.

Commissioner CULBERTSON. Is not the sheepman a pretty heavy borrower?

Mr. WILSON. There is no county record of it. Their notes are considered good by the lenders. The amount of indebtedness was very large at the time of the investigation before the Payne-Aldrich bill was passed, but whether it is now I do not know.

Commissioner CULBERTSON. As a rule, borrowing is a sign of progress.

Mr. WILSON. Nearly always, unless it is caused by big losses. What is true here of the weather, Mr. Commissioner, may not be true over the top of the divide. We may be completely covered with snow, and 10 miles away there will be none.

Commissioner CULBERTSON. Wherein does the industry in the northern part of the State differ?

Mr. WILSON. In the eastern one-third of the State, the sheep business is being practically eliminated. We used to run 30,000 to 40,000 head and four years ago we had something like 18,000 or 19,000. We call an outfit the number we go into the winter with. Several years ago we had 17,000, the next year 12,000, and the last year we sheared something over 10,000. We are preparing for 7,500 this winter, which is the limit now, although we have just as much land as before.

Commissioner CULBERTSON. Is this decline in the size of the flock due to homesteading?

Mr. WILSON. Yes; absolutely; 90 per cent are sticking until they prove up. There are school teachers, railway men, ne'er-do-wells, and quite a proportion of old maids. These people have simply taken the land with the expectation of

holding it the necessary 3 years and living on it for 7 out of 12 months, and then selling it.

In the Lost Springs district are some No. 1 farmers who are shipping several carloads of wheat, oats, and potatoes and are making something of a success.

Commissioner CULBERTSON. Do you think the grazing men will gradually buy out these homesteads?

Mr. WILSON. The sooner this land passes to private ownership, the better for the Government, the State, and the individual. I prefer to see it sold at a nominal price, at a low rate of interest, and on long-time payments of one-twentieth or one thirtieth of the principal each year, and giving to these men the Government sections in the checkerboard.

Another thing that renders the business uncertain and unsafe is the action of the State in regard to State lands. When Wyoming was admitted as a State there were a certain number of acres given for university, capitol, penitentiary, school purposes, etc. We used to lease that land for five years, but now they reserve the right to sell it any time, and to hold it you must outbid the other fellow. Grazing land connecting good pieces of land has been sold for as high as $150 an acre. That is the uncertain condition existing to a great extent over the eastern one-third of the State. With this decrease from 40,000 to 7,500 you wonder why we do not liquidate. Last year we would have, but found there would not be anything left. The increased value of the land is where we will make something in the final liquidation. There has been a very material increase in land values, though range lands and ranches are pretty hard to value because so few change hands. The increase, taking the few ranches that have been sold, has been two or three times their cost or selling price 15 or 18 years ago.

Commissioner CULBERTSON. You feel that the sheep industry is tending toward a stable basis in this State, do you not?

Mr. WILSON. Yes; and I think it is most stable in this region on account of the railroad lands.

Commissioner CULBERTSON. Are not these land difficulties almost unavoidable in any transition from a free to a controlled range?

Mr. WILSON. It all depends upon whom you are talking to. The dry farmer will tell you it is the best farming land in the world. A man from Missouri said it was the best peach land that could be found anywhere; but he left the country, and he did not get any peaches.

Mr. RUMSEY. Is not a large portion of Wyoming fit only for sheep?

Mr. WILSON. Yes; a very large portion. On the mountain range we ran sheep for quite a while without cattle, but found that while the low sheep grass was being eaten off the coarse grass was increasing. We bought cattle, and since then it is a better cattle range and a better sheep range. We are running both together now.

Mr. DALEY. What are the unappropriated lands in this State most adapted to?

Mr. WILSON. Grazing. When you undertake agriculture you spoil the grazing land. Places plowed up and abandoned are growing up in all kinds of weeds and not in grasses.

Commissioner CULBERTSON. Does the sagebrush ever come back?

Mr. NOBLITT. Yes.

Mr. WILSON. Yes; if you do not put water on it. We tried an experiment in dry farming eight or nine years ago and some of the land has probably been plowed up two or three years, and about a fourth of it has come back in sagebrush.

One of the troubles of the sheepmen is their method of selling wool for which, as a rule, they do not get the value.

At a banquet in Boston with some dealers and manufacturers of wool I was asked why we did not put wool up better in the West, and I told them that there was no inducement, as the man who put it up poorly got just as much. A manufacturer said to me, "Do you mean to tell me that the wool dealers do not pay any attention to the way it is put up?" and I told him they did not. I was told that when a wool company wanted to buy 500,000 or a million pounds of wool that they have an average price and saw that the buyers were held down to that point.

The grading of wool to-day is not done with scientific accuracy. We have had our wool graded for three or four years. The grader says, "How do you want this graded?" I told him I didn't know, to grade the way the manufacturer wanted it. He says, "If the man that I am working for wants it to go in this bin I will put it in there, and if he wants it to go into this other bin I will put it in there."

Commissioner CULBERTSON. Will you speak briefly on the Montana situation?

Mr. WILSON. Conditions in Montana are similar to those in northern and eastern Wyoming.

Commissioner CULBERTSON. Agriculture has encroached more in Montana than Wyoming?

Mr. WILSON. Not any more than it has in eastern Wyoming. In Converse and Niobrara Counties, outside of the mountains, more than 10 per cent of the land is in the hands of settlers.

Sheep in Montana are being crowded to the north and west, particularly northwest. There were quite a lot of sheep and cattle on the Crow Reservation, but the charges have been put up so much that they simply had to quit the sheep business. They used to rent the whole reservation for less than $10,000, and now it must be three or four hundred thousand. Individual leases run as high as $75,000. Leases on the Crow Reservation run considerably over one dollar per sheep.

During the drought in Wyoming quite a number of sheep and cattle were shipped to other parts of the country, and I doubt very much whether more than half of them came back. From the eastern part of the State, north of the Platte River, at a conservative estimate, 40 per cent was shipped out.

Mr. DALEY. What proportion of that 40 per cent has gone to market? About half; and the other 20 per cent into other sections for winter grazing?

Mr. WILSON. Yes. They were trying to ship hay into the Yellowstone sheep country, but I think they have given that up.

Mr. RUMSEY. That is really a temporary condition in Montana.

Mr. WILSON. Yes. It is a common occurrence in New Mexico and in certain localities of Arizona, but it seldom takes in as much territory as in the last three years. I have been here since 1886, and I never saw anything like this all over the State.

Mr. DALEY. In the event of failure to sell the public domain on long-time terms, how would you suggest handling it?

Mr. WILSON. I would turn it over to the State in preference to the Federal Government. My experience with some of the Government bureaus has not been very flattering. I have opposed the Kendricks and Kenyon bills on the ground that if it goes under the bureaus there would probably be established one of the largest bureaus they have ever had in the Government, and the bureaus can not hire the type of men to handle these things because of the wages paid by the Government.

Mr. DALEY. Do you think that the State could more intelligently administer its own lands than the Federal Government?

Mr. WILSON. I believe you can handle your business much more intelligently and better in your locality than I can, and I believe that I can handle my business better in my locality than you can. I do not believe that men 1,500 or 2,000 miles away can handle it as well as the people in the State.

STATEMENT OF MR. W. W. DALEY, OF RAWLINS, WYO.

Mr. DALEY. The winter feeds used here on the range are hay, corn, and oil cake. The winter range is the Great American Desert, on which there is very little water. We depend entirely upon snow for moisture, and, as a rule, the sheep won't eat enough snow to digest the hay, and, consequently, many sheep are lost with a full belly. We feed corn and oil cake to keep the animal alive.

Commissioner CULBERTSON. I wanted you to discuss the different types of shearing plants and their relation to grading.

Mr. DALEY. This particular locality, probably more than any other section of the country, has tried out the two systems. The American system is known as the "grading system," and the grading is done principally by men sent out by the National Wool Warehouse & Storage Co. of Chicago.

The grading is done in the shearing shed, as it can be more intelligently done as the fleece comes off rather than to open up a package of wool in an eastern center to separate it.

The other system is the Australian or classing system, and there are others here who can better testify as to that.

STATEMENT OF MR. L. A. SMILEY, SMILEY LIVE STOCK CO., RAWLINS, WYO.

Mr. SMILEY. About five years ago the first Australian plant was built and the fleece skirted. There is a misunderstanding about there being 14 grades. There are only four grades, but these are subdivided because of heavy and light shrinkage.

Mr. RUMSEY. That is, firsts and seconds?

Mr. SMILEY. It is the same class of wool, but part of it is of heavy shrinkage and part light. In a small clip they would only make one class of it, because there would not be enough of either one for a bale. The grades are made the same as by the American system, but are more subdivided.

Commissioner CULBERTSON. What led to the development of the Australian system in this locality?

Mr. SMILEY. The American system was not thorough enough.

Commissioner CULBERTSON. Was this demanded by the manufacturers?

Mr. SMILEY. There were certain manufacturers who would not buy American wool, just Australian. We put up our wool in that way and sold it direct to those manufacturers with very profitable results.

Commissioner CULBERTSON. You have thus made your competition with Australian wool more effective?

Mr. SMILEY. Yes; though we can not get perfect help, as they do in Australia. It takes experts to do this work right, and that is the reason it is not better done here.

Mr. RUMSEY. Are your graders Australians?

Mr. SMILEY. We have some Australian and some American graders.

Commissioner CULBERTSON. What percentage of your clips is graded according to the Australian system?

Mr. DALEY. I would say about 25 per cent in this particular locality.

Mr. SMILEY. I would say a little more than that. There is a plant at Boyers which shears about 30,000; at the Dodd plant, probably 60,000; at the

Ferriss plant, about 80,000; at the Walcott plant, about 50,000; the plant at Medicine Bow, 30,000; the plant at Wells, from 50,000 to 60,000. Then, there are 20 or 30 more sheds in other parts of the State and in Nevada and New Mexico. They are building them right along.

Mr. DALEY. Has this classing brought better prices?

Mr. SMILEY. Where we make heavy and light classes of the same kind of wool we get 2 to 3 cents a pound more for the light than for the heavy shrinkage; if we had the two together we would probably get the price of the heavy. Wool sold in the original sacks, which brought 50 cents, if graded would probably have brought 70.

Mr. DALEY. Besides getting a better price, has there been any other benefit?

Mr. SMILEY. It is a more humane way of handling the sheep. Of course, there is the initial expense of building a plant which, so far as the pocketbook goes, could not be considered a benefit. If your wool is graded, you know how many coarse sheep and the number of lambs you have.

Mr. DALEY. Would you say that the value of the wool here had increased or decreased in the last five years?

Mr. SMILEY. I think it has increased. Dealers that used to come here and make a blanket price for the poor wool as well as the best, know that we are educated now to the difference in price of graded wools.

Mr. LARSEN. Under the Australian system, do you shear by machinery?

Mr. SMILEY. You can shear either by hand or machine.

STATEMENT OF MR. GEORGE A. BIBLE, REPRESENTING THE LEO SHEEP CO. AND THE SANDSTONE SHEEP CO., RAWLINS, WYO.

Mr. BIBLE. In my position here in the bank I have noticed a difference in the prices obtained for wools prepared under the Australian system.

Classed wools are put up so that any manufacturer in the United States can come to the commission firm who handles them and buy the amount they can use. In former times they could not buy a clip of 200,000 or 300,000 pounds and pay a good price for it, because so much of it was not suitable for their mill needs. The firms which manufactured the highest grade fine materials, used in making expensive dress goods for women, etc., thought it necessary to buy exclusively Australian classed wools.

That the Australian system makes a large number of classes which are hard for the dealers to sell is propaganda put out by the dealers themselves to discourage classing of western wools and to keep the western wool growers ignorant.

Australian classed wools are put up in bale units. The First Wool Brokerage Co., 136 Federal Street, Boston, has been organized by a number of the sheepmen to handle almost exclusively Australian classed wools. On the sales floor of this concern the 400,000 pounds of wool of the Cow Creek Co. and the Pioneer Sheep Co. would be stored. Merino wool would be found in two lots, the Merino combing and the Merino clothing; the come-back wool would be in another class, half-blood in another, and quarter-blood in another; locks, tags, and other off classes in other departments. Of the Merino combing wool one division would be the extra long, called "A," and the other the short combing. When a manufacturer who handles nothing but long-staple Merino wool calls at the salesroom he can select just what he needs; as a rule, he pays a fraction more for that choice wool. A manufacturer using both qualities can purchase from the same lot. There can be no objection to increasing these two subdivisions, because the bale is the unit.

The argument of the commission man that he can not sell in these different classes is ridiculous, because the subdivisions are all on the floor together, and if his customer wants to take it all, the same as has been his custom in the original sack, he can handle it exactly the same way, and the wool grower receives the benefit.

Commissioner CULBERTSON. That reveals to me how, by grading, competition against foreign wools can be met more effectively.

Mr. DALEY. Are the wools put up under the Australian system sold at the shearing corral?

Mr. BIBLE. The most approved plan would be to send the wool east, to be sold direct to the manufacturers; but that plan does not always work out, because if a wool grower is in debt he will take a lower price and sell to a commission man here, even though he knows that the commission man may be making 5 or 6 cents a pound on the transaction.

Mr. DALEY. Is it the plan to ship this wool to the First Wool Brokerage Co. at Boston?

Mr. BIBLE. It works out better that way, although if other dealers would not discriminate against it their service would be just as good.

Mr. PETRIE. How much more per pound does it cost to prepare wool in that manner, instead of putting it in a bag as formerly?

Mr. BIBLE. Two cents per fleece, or about one-quarter of a cent per pound.

Before me is an account of Australian classed wools and of wools sold in the original bag; 100,000 pounds of the latter sold in Boston for 53½ cents. Another clip of about the same character classed under the Australian system brought the following prices:

	Cents.		Cents.
Half-blood wool	64½	Come-back wool	64¼
Three-quarter blood wool	63½	Three-quarter blood wool	66¾
Cotswold rams' wool	58½	Clothing wool	55

The least desirable brought:

Combing Merino wool	59½	Black wool	55
Belly wool	58½	Tags[2]	20

This clip netted all the way through 59.57 cents, but the sale price would be about 64 cents, as compared with the other 53½.

I have here another account for last year from the same territory of wool sold in the original bag at 50 cents per pound.

Mr. NOBLITT. In the beginning of your experiments with the Australian system, did not the wool dealers oppose the plan in every possible way and, in some instances, even refuse to buy? They had not encouraged you in the proper preparation of the product, had they?

Mr. BIBLE. They did not make an actual fight against the plan as they did against the National Wool Warehouse & Storage Co. They objected to it, for when the sheepman gets his wool up properly he can obtain full value, and the commission man can only make a fair commission instead of a large profit out of ignorance of the woolgrowers. Up to a few years ago the sheepmen were never allowed anything for increase in weight after the wool was shipped from this territory.

Commissioner CULBERTSON. Is the Australian system increasing in popularity?

Mr. BIBLE. There is no doubt about it. Every year we have one or two new sheds erected.

[2] Wool remaining after everything of value has been picked out by experts.

Mr. NOBLITT. Do you not think that the opposition of the wool dealers was considerably exhausted fighting the so-called American plan?

Mr. BIBLE. I think there is some opposition to it; but they are using different methods now. Commission men have approached a number of owners of Australian sheds and told them they could get more if their wool was not classed.

Mr. RUMSEY. Has not Australian classing and American grading increased the price of wool to the grower 8 to 10 cents per pound?

Mr. BIBLE. From 5 to 10 cents per pound; yes. Classing and grading of wool has resulted in determining the better grade of sheep. Besides, the sheepmen in this vicinity show more intelligence in breeding sheep and raising wool than 10 years ago.

Mr. RUMSEY. Were not these improvements in grading wool and breeding of sheep necessary steps to combat free trade?

Mr. BIBLE. Yes. We are compelled to use every means possible to produce better prices and meet competition under free trade.

Mr. DALEY. In 1910 the National Wool Warehouse & Storage Co. of Chicago started to improve the preparation of wool for market. They tied with paper twine, kept the black wool separate from the white, and also kept the tags separate.

Mr. NOBLITT. And they started to brand with soluble ink?

Mr. DALEY. Yes; which would scour out. That propaganda was kept alive until 1915, when the company sent out graders. In 1916 the Australian system started. Both systems led to a better preparation of the wools, we believe, not only in classifying wool but in baling instead of sacking, which is also of material help to the dealer, as it takes only about half the warehouse space.

STATEMENT OF MR. HARRY PETRIE, GOLDEN, COLO.

Commissioner CULBERTSON. How many sheep do you run, Mr. Petrie?

Mr. PETRIE. Eight hundred registered Hampshires and four bands of range sheep.

Commissioner CULBERTSON. What are the characteristics of the sheep industry in Colorado?

Mr. PETRIE. Colorado is fast becoming a feeding and not a breeding State, owing to the rapid settlement of public lands and advancing costs of individual holdings formerly used as winter, fall, and spring ranges. This is best proved by the fact that the national forests in Colorado are largely occupied by Wyoming, Utah, and Idaho sheep.

Bankers throughout the State report heavier sheep loans in the fall of 1919 than in 1918, while flocks did not increase. This condition was brought about by increased land values, consequent higher taxes, higher wages, and general high cost of operation. On the whole, Colorado sheepmen are not receiving suitable returns on the capital invested, to say nothing of the risks run in this hazardous enterprise.

Commissioner CULBERTSON. Are the sheep owners of your locality reducing the size of their flocks?

Mr. PETRIE. Yes; to a considerable extent. There are more small flocks on farms.

Commissioner CULBERTSON. Have you changed your method of flock management in the past six years?

Mr. PETRIE. In this section we have raised mostly mutton lambs.

Commissioner CULBERTSON. Has the quality of the wool clip improved in the past five years?

Mr. PETRIE. There has been no particular change.

Commissioner CULBERTSON. Do you grade your wool or use the Australian system?

Mr. PETRIE. I do neither. The Australian system has never been used in our locality.

Commissioner CULBERTSON. Have cooperative wool sales been tried in your locality?

Mr. PETRIE. Cooperative wool sales have never been tried.

Commissioner CULBERTSON. What management of the public lands would give the most aid to the sheep industry?

Mr. PETRIE. Either annual lease, purchase on long time at low rates of interest, or Federal control similar to that of the national forests. Most of the public lands remaining in Colorado are grazing lands and not suitable for homesteads.

Commissioner CULBERTSON. Will you describe briefly the flock management and the kind of forage used for small flocks on irrigated ranches?

Mr. PETRIE. They use waste lands for pasture, and feed through the winter. In the fall sheep utilize the meadow lands to better advantage than any other stock. A combination of sheep and cattle raising is in most cases successful on account of the more complete utilization of forage and grasses.

Commissioner CULBERTSON. What is the comparative profitableness of sheep and cattle raising?

Mr. PETRIE. This depends upon the nature of your ranch and range.

Commissioner CULBERTSON. Which would be worth more to you, 8 cents more per pound for your wool clip or 2 cents per pound increase (average for the year) in the price of market lambs?

Mr. PETRIE. Two cents per pound increase in the price of market lambs.

Commissioner CULBERTSON. To what market do you ship your lambs?

Mr. PETRIE. To Denver.

Commissioner CULBERTSON. Will it pay the sheep men to lay more emphasis on breeding for mutton qualities?

Mr. PETRIE. That depends entirely upon location. In the high countries it is difficult to mature a market lamb; therefore they must depend on wool and feeder lambs, consequently sticking to the Rambouillet or wool type.

Commissioner CULBERTSON. Which have been the two most profitable years since 1910 for the wool growers in your section?

Mr. PETRIE. 1916 and 1917.

Commissioner CULBERTSON. Which was the more profitable year, 1918 or 1919?

Mr. PETRIE. The year 1918. I think 1919 will prove the worst year.

Commissioner CULBERTSON. If the price of land keeps going up, is there any way the sheep man can adapt himself to the situation and continue in business?

Mr. PETRIE. There is absolutely no chance for him.

Commissioner CULBERTSON. Will you compare in a general way conditions now prevailing in Nevada with those existing prior to the war?

Mr. PETRIE. Nevada finds itself in a peculiar condition, having winter range far in excess of summer range, brought about by the 640-acre grazing homestead filing and the constant overgrazing of public domain. Most Nevada stockmen are desirous of having the Government handle the remaining public lands in the same manner as the national forests. No doubt some favorable leasing law would meet their needs.

In Nevada the 640-acre grazing homestead is a joke, as far as a man being able to make a living is concerned. His only chance is to acquire title and sell to a stockman. Flocks are gradually being reduced owing to the shortage of proper range.

Practically no wool grading is done. The percentage of mutton lambs raised is slightly on the increase.

Inquiry among bankers indicates that the sheep business is not on a very satisfactory basis. Loans are universally on the increase, while the contrary is true of the size of the flocks.

CONFERENCE AT COLUMBUS, OHIO, DECEMBER 3, 1919.

STATEMENT OF MR. THOMAS M. BURROUGH, PRESIDENT OF THE NOBLE SHEEP & WOOLGROWERS' ASSOCIATION, QUAKER CITY, OHIO.

Mr. BURROUGH. I live in Quaker City, Ohio, in Noble County, which is in the southeastern part of the State, in the fine-wool section. About 40 years ago I began the sheep business with the Merino. At that time the stock was what was termed American Merino. In those years these Merinos came from Harrison County. They came as the result of faultfinding with regard to too many wrinkles and too greasy fleece on the old Vermont sheep, and the American Merino was the result of breeding that out. That went on for a few years, until the Delaine type came in. Up to that time the American Merino and black top sheep were the sheep that we handled. We continued with the American Merino perhaps some six or seven years. Then we took up the black top. This is a fine-wool sheep of a little above the average size, rather plain, and called the black top because the oil in the wool comes to the surface and, as it dries out, it leaves the top black. We continued with that type, perhaps, for 25 years. We now have the Dickinson Merino, as they are termed. As the fine types of sheep go now, I am in class B of the Merino.

Some years ago the breeder associations met here at Columbus. I was present. The business had run down so that the thoroughbred men were neglecting their records, and they decided that if they were going to preserve the records at all they must get together. They did that, and all of these things were put into one record, and the Merino sheep were divided into class A, or type A, type B, and type C. The type A sheep was a very wrinkly sheep; the type B did not have so many wrinkles; and the type C was the smooth type. But they were all fine-wool sheep. So the black top type and all these other types went into that classification. However, we still know these different families by the older names by which they were first designated. My sheep are all thoroughbreds, but not registered. I did not keep up the registration. I am in the sheep business for the wool and have 300 head on 155 acres of land. I keep, perhaps, three or four horses to run the sheep business. We run, perhaps, three to five head of those, varying at different times. With respect to cattle, I keep the cattle to keep down the waste of feed such as the sheep do not readily eat. I run—take the cows and calves and some of the others coming along—perhaps 12 or 14 head. I have no hogs. We raise our own feed, and all the feed raised goes into sheep and the other live stock. Outside of the meadow land, there are about 90 acres of rough pasture.

Commissioner CULBERTSON. Would any other type than the Merino run on that land at all?

Mr. BURROUGH. Yes, sir; but the type that I have, the fine Merino sheep, are best adapted to the land in my locality. In small numbers, occasionally, by feeding or something of that kind, I have tried the Down sheep, but my experience over a period of years has led me to the conclusion that the fine wools are best adapted. They will run in larger flocks and can be crowded closer into buildings than any of the coarse-wool sheep.

Commissioner CULBERTSON. I have not quite clearly in my mind the reason why you persist in the merino type. What percentage of the income from that type now comes from the wool and what percentage from the lambs? Can you tell me approximately what percentage, let us say, of your gross income comes from the wool and what percentage from the sale of lambs?

Mr. BURROUGH. I might be able to help you a little with this statement. I keep ewes principally, so I made an estimate based on 100 head of ewes for one year. As to the lambs you get, a man must be an expert; he must have good sheep and they must be well cared for if 100 head of ewes are to produce and bring up for sale 95 head of lambs. That is the top figure. I have estimated 100 ewes as raising 95 lambs which would sell on the 1st of November at $6.50 per head, making $617.50. My average clip was 10 pounds per head last season. I made an estimate here of 11 pounds, but my average was 10 pounds, sold at 76 cents per pound. On that calculation I am getting about 50 per cent of my income from wool and about 50 per cent from lambs. If I were running mutton sheep I would not make a greater gross profit off them than off the fine-wool sheep. Although I quoted the selling prices here as those of the 1st of November, my practice generally is to feed these lambs until the 1st of April, shear them and sell them, keeping the wool I get from them. If I were raising mutton sheep—I have fed mutton sheep a few times—I should generally sell those with the wool on them along in February and March. The man that shears, ties, and sacks the fleece at 25 cents a head in 1918, we paid 10 cents a head in 1910 for shearing alone, and for shearing and tieing it would be about 14 cents. The past year the wool was consigned to and sold through Horkheimer Bros., of Wheeling. Heretofore we had been selling it at the barns, to be delivered at the nearest railroad point. It was graded by individual flocks by this firm. My flock went into about five grades. We never grade at the barns.

Our consignee sells direct to the manufacturer. Part of our wool goes to Columbus, and the rest of it to Wheeling, W. Va., to be graded. Then notice is sent out to the manufacturers that work up that grade of wool and they come and view the wool and buy it. Something over 2,000,000 pounds out of the State clip of about 12,000,000 was handled by the association. In the earlier days the wool was sold through the local agents, as we termed them; that is, the dealers who bought and sold the wool had agents throughout the country. These agents came to the farm and bought the wool for delivery at receiving stations, generally at some point along the railroad. After shearing the sheep go right on pasture for the summer. We breed the 1st of November for April lambs, and begin to feed about the 1st of November. I begin giving them a little grain. They are still on grass. Then I soon go to grain and hay. The feeding will last until the 1st or the middle of May. I keep the lambs and ewes under shelter until about then, except just through the day, when we let them out to exercise. If we have an early season, we let them out for a little grass, so that the ewes will milk better. We generally market the lambs in October, but the last few years I have been fattening my lambs, shearing about the 1st of the next April, and then shipping to market.

Commissioner CULBERTSON. Can you not develop a little further the value of the fine-wool sheep as compared with the mutton type, so far as profits are concerned? Why is it you have considered the fine-wool sheep as the sheep peculiarly fitted or adapted to your locality? I assume you are a progressive sheepman and that you would adopt the mutton type if you felt you could make more money from them.

Mr. BURROUGH. I have kept the fine-wool sheep because I have found that I could make more money from the fine-wool sheep than from the coarse-wool

sheep. I get more money from fine wool than I would for the wool from a mutton flock, and although there would be more money from the lambs from the mutton sheep than from the Merinos, mutton sheep eat more feed, eat more grain through the winter season than the fine-wool sheep. Then another thing: In order to keep up their state of health and have them thrifty, the coarse-wool sheep must be kept in smaller bunches; they must have fresher pasture. They can not continue on the same pasture as long. If you put on one bunch of sheep, the pasture must have a rest before you can put on another bunch, if you expect to keep up the health of your sheep. They haven't the constitution; they can not stand crowding; and when it comes to housing in the wintertime you have to house them in bunches of 25, while you can house the fine-wool sheep in bunches of 50, 75, and 85, and they will keep thrifty and keep their health and will do well. If you do that with the coarse-wool sheep, they will sicken and die; they can not stand the crowding.

Mr. CLEAVER. I would like, in part, to answer the question just asked—why the wool grower or sheep man keeps the Merinos instead of the coarse wools. One reason for it is this: The profits from the different parts of the business are so very small that it is necessary to economize on every hand and keep an ewe that will raise a mutton lamb, one that will better pay her board bill. A Merino will shear pounds over a coarse-wool sheep and better pay her board bill throughout the year, and she will raise a lamb sired by a Shropshire or any mutton sire that is almost as good as a straight mutton-bred lamb, or at least that answers the purpose. They are quick maturers; they are only kept from 4 to 6 months and the dam is kept 12 months. These breeders from years of experience have found it more profitable to keep the Merino dam and use the coarse-wool sire in order to make a profit out of the business.

Commissioner CULBERTSON. Let me ask Mr. Burrough a question on that point. Do you use mutton bucks?

Mr. BURROUGH. No, sir; I am in the sheep business for the wool. I grow wool. I am a wool grower.

Commissioner CULBERTSON. You use the same breed of buck that you do ewes?

Mr. BURROUGH. Yes, sir; I figure I make more profit by keeping my lambs, shearing them, and selling them at the price I get for the fine wool than would be secured from the extra amount of mutton I would obtain from breeding the coarser sheep. For perhaps something like two or three years I used Shropshire rams on my ewes. I didn't use my whole flock, but I would simply take a bunch of 50 ewes, say, and let my Shropshire bucks cross them. That was in years when wool was very low and I would make a shoot off, thinking I could make more money from the mutton lambs. Sometimes I would make more money that way. Sometimes the wool market would change again and I would not do any good by it. Occasionally a few men in my section have made a practice of taking a 4 or 5 year old ewe and crossing it with a mutton buck, but bred their young ewes to a Delaine buck to keep up the foundation stock.

The average life of an ewe is six years. Sometimes, like old people, they give out and die; sometimes we try to fatten them up for market; other times we sell them for stock sheep; they go farther West, and some man out there tries to fatten them and market them.

We have had trouble with disease in years past, but not of late years. We have nothing that compares with the extensive losses they have in the Mountain States, because our sheep are well cared for. They are housed through the winter. We do not have the storms to combat.

I have two men as a rule to keep the farm and the flock. In 1910 I paid them each $1.50 per day and their board throughout the entire year. I am paying those men to-day 20 cents an hour and board. That would amount to about $2 a day for about half the year. Sometimes they work 20 hours a day. Sometimes I have to put on additional help at lambing time, but as a rule these two men and myself handle the situation. I get additional help from them at lambing time by paying double time. That is where we get the 20 hours in a day, but that can not last long—about one month.

Oil-well and coal-mine development down in my section of the country have been rather against the sheep business, for two reasons. One is that when a farmer has a coal mine on his land it brings him into a different line of agriculture—vegetables get higher, and he is liable to fall into that line of farming. The other reason is that if oil is developed on his farm he is getting his money so much easier than he can by raising sheep that he is liable in a good many cases to let the sheep go.

I do not think we would make much money out of Down sheep if I were to quit the fine wools, because they take more feed, more of our grain. It is a winter-feed proposition which favors the retention of the fine wools rather than a change to the Downs; the grain is the expensive part of the feed. It takes at least one-half more feed to carry 100 coarse-wool ewes, or medium-wool ewes, through the winter than it would for that many fine wools. I would have the heavier carcass of the lamb to sell, but housing would also be more expensive. It would take as much room again. I would have a higher percentage of lambs from a mutton flock than from a Merino flock; there would be a gain in that respect, but I have found the balance the other way.

Commissioner CULBERTSON. It would seem to me to depend very largely on the price of mutton and the price of wool. If you struck higher prices of mutton in a season, it would be desirable to emphasize the mutton, would it not?

Mr. BURROUGH. Yes. That is what I did in the years I told you about when the wool price was low and prospects were not very good; we would make a cross, raise coarse-wool lambs and get them out of the way, and then when the price of wool came back a little bit we still had our flock of ewes to go on raising the fine wool. On the other hand, if I were to change to Downs, I would not be able to get more than half as many ewes on my pasture as I now have of fine wools, so that while I would get a higher percentage of lambs from Down ewes, I would only be able to carry half as many of them on the same land. Also, when I told you the number of acres I had and the number of sheep carried on them that was an extreme case. I think, if you question any of these men, that you will find there are not many men anywhere who are carrying as many sheep on that number of acres. One sheep to the acre is generally what is considered safe and sane for a man in the sheep business.

I run cattle on my sheep farm to make use of the feed which the sheep do not readily use for the winter, to save the waste. I refer to the heavy corn fodder and the coarse hay. Sometimes there will be some hay damaged, and occasionally the corn will be a little soft. We can turn the cattle in on that, but if we turn the sheep in on that perhaps we will have some sick sheep.

Commissioner CULBERTSON. Suppose something should happen to the sheep industry, so that it passes out of existence in your locality. Could the land that you have be utilized for any other purpose?

Mr. BURROUGH. Yes; it could be, but it would depreciate in value. We could raise some grain and some hay on the valley land. Part of my farm is valley land and the rest of it hill land, and if I had no sheep on the farm we could pasture cattle on the pasture land, but I do not think the land would net me as much income from cattle as it does from sheep. I believe the most effective

use of my land, from the standpoint of income, is for sheep. I believe if I can keep the sheep I can grow grain to feed them, I can be careful with the manure, and I can carry on that business without lowering the fertility of the land.

From 1911 to 1916 and 1917 the number of sheep in Ohio had declined, and practically everywhere cattle and dairy cows have increased. In my section cattle and hogs replaced sheep to quite an extent. When wool was so much lower and not considered profitable, half the men, perhaps, who had formerly been engaged in the sheep business either went into the dairy cattle or some line of farming—hogs, dairy cattle, etc. When you run hogs and cattle you have to grow more corn. A good many men were not able to make that change. I was one of them.

Commissioner CULBERTSON. Have you a statement that you want to put into the record?

Mr. BURROUGH. Yes; if it will be of any use to you.

STATEMENT.

November 1, 1918, bought 100 head of 4-year-old ewes at $12 per head and 2 rams at $40 per head.

Alfalfa hay, at $28 per ton; clover, at $25 per ton; corn, at $1.90 per bushel; oats, at 85 cents per bushel.

On dry feed, 196 days; pasture, 5½ months.

Labor, 40 cents per hour.

Shearing and tying wool, 25 cents per head.

100 ewes, at $12	$1,200.00
2 rams, at $40	80.00
200 bushels corn, at $1.90 per bushel	380.00
200 bushels oats, at 85 cents per bushel	170.00
10 tons alfalfa, at $28 per ton	280.00
1½ tons clover, at $25 per ton	37.50
Salt	3.00
Interest, at 6 per cent	141.03
Rent for barn and lot, at $5 per month, 6½ months	32.50
Shearing and tying wool, at 25 cents per head	25.50
Pasture, 102 head, 5½ months, at 12 cents per head; 95 lambs, 4 months, at 6 cents per head	90.12
Labor, 546 hours, at 40 cents per hour	218.40
Taxes	42.45
	2,700.50

Receipts, Nov. 1, 1919:

100 ewes, at $11 per head	1,100.00
2 rams, at $30 per head	60.00
102 fleeces wool, 1,140 pounds, at $1 per pound	1,140.00
95 head lambs, at $6.50 per head	617.50
Manure from barns	25.00
Total	2,942.50

I would say, as a man having had a good many years' experience in sheep, that I have selected 100 head of ewes bought on November 1, 1918, at the price of $12 a head, and have figured the price of feed in the barn at that time, the expert care of the sheep, the rent for the buildings, and charged for the number of hours spent in the care of those sheep, shearing, and all that, and then I have

figured the price that we must have had for the wool per pound in order that the sheep might equal the expense for the year.

Mr. CONNOR. Can you give us a statement comparing the fine-wool with the coarse-wool sheep in your section?

Mr. BURROUGH. Perhaps there are other men who can do that better than I can. While I have had some experience with coarse-wool lambs I would have to figure about on the basis that we talked of before, that the coarse-wool sheep will eat about one-half as much more grain and hay as will the fine-wool sheep. That is according to my knowledge and experience, and I would have to figure it on that basis. It will take more land to pasture a hundred head of coarse-wool sheep than of fine-wool sheep, because you can not get as many on an acre if you want to keep them healthy. In the statement I have figured it at market prices, at the price it would have cost me at that time put into the bin, if I had purchased it. I charge rent for the farm. Interest at 6 per cent is on investment in the sheep. I charge rent for the barn, and no interest on the land because I rent the land—that is, I rent my sheep pasture—and I buy feed. I have bought feed for the sheep and I am going to make on some wool and on some lambs, and I figure on the basis a manufacturer would figure.

Commissioner CULBERTSON. Following the coming of free wool in 1894, which you no doubt recall, did you in any way change the character of your flocks? Did you reduce your flocks?

Mr. BURROUGH. We tried to, but we could not. You could not sell off the sheep. I knew one man that sent a bunch of sheep to the market, to the Pittsburg market, along in those years, and he got notice back from the commissioner to send additional money to pay the freight. I knew a man that turned the sheep out into the road and tried to get rid of them in that way. Some of us kept them on grass and concluded that perhaps a time would come when things would be better.

Commissioner CULBERTSON. When free wool came in 1913 what was the effect on the sheep industry?

Mr. BURROUGH. We got a better price for the wool than we did the year before.

Commissioner CULBERTSON. Free wool, then, had very little effect on the industry?

Mr. BURROUGH. It did not affect the industry with us at that date.

Mr. CONNOR. Around in the nineties, during that period of free wool, what did you sell the wool for?

Mr. BURROUGH. The least per pound I sold wool in the nineties for was 13 cents, washed wool.

Mr. CONNOR. In your statement, Mr. Burrough, you have 400 bushels of corn and oats for 100 ewes, and 19½ tons of hay. Is not that pretty heavy feeding?

Mr. BURROUGH. That is good feeding; yes. I am doing big things with that bunch of sheep; 95 lambs to 100 head is a big yield.

Commissioner CULBERTSON. Are there pastures rented for sheep in your locality?

Mr. BURROUGH. Yes. In 1910 the pasturage was 10 cents per sheep per month; at the present time, 12 cents.

Mr. CLEAVER. Aren't you mistaken in its being 12 cents at the present time? We are paying in our country 20 to 25 cents.

Mr. KEETON. We paid 20 cents.

Mr. BURROUGH. I did not rent any pastures this past season, but that is what we were paying. Where we pay that price we do not put very many sheep to the acre, about 125 acres of pasturage for 100 sheep.

STATEMENT OF MR. S. M. CLEAVER, REPRESENTING THE AMERICAN DELAINE MERINO ASSOCIATION.

Mr. CLEAVER. I live at Delaware, Ohio. I have been secretary of the American Delaine Association for many years, and I am president of the Ohio Wool Growers' Association.

I am what might be termed a stud-flock breeder, furnishing rams for the flocks of the country. I have been in the work of breeding pure bred and registered sheep for more than 50 years. I have not made a business of handling wool alone or of handling crossbreeds. I have been following one line of breeding all my life, pure-bred Merinos. My liking is for the heavy-shearing Merino. When you want to produce a large amount of wool for the amount of food consumed you must have, or very close to, the wrinkly sheep in order to get the density and weight of fleece.

The Merino classes into three types, A, B, and C. The As are the extreme heavy-wrinkled sheep, the Bs are the medium in marking, and the C sheep are or should be without wrinkles, although the breeders know that they have to have more or less neck folds, and they have to stay very close within the wrinkly blood to keep the weight of the fleece up to a satisfactory number of pounds in order to make the business fairly profitable. The Rambouillet, when they came into this country, were very heavy folded, heavy wrinkled. That dates back when I was a very small boy, in the fifties. Later they went to breeding the plainer sheep, and the sheep imported from France and Germany in the later years came into this country plain, or nearly so; that is, a large part of them.

Commissioner CULBERTSON. That included the Saxon Merino?

Mr. CLEAVER. No; not including the Saxon Merino. They were strictly plain. The Rambouillets have been bred more for mutton than the plain type—in order to keep up the weight of fleece they are breeding now to the B type. They have classed them as the B type, and they are classing them at the big shows and are breeding the heavy-folded Rambouillets after the original type of 60 or more years ago.

I have 180 acres. I suppose a third of that is good corn land, good black land, and the balance of it is lighter clay soil, thinner land, more upland. I usually keep about 100 breeding ewes. They are all registered at the present time. At home I have about 150 head, and then I have some out on shares, which I shall not consider in talking about this farm.

The farm will support 150 breeding ewes by putting the lambs off each year, as I do. I do not usually have anything kept over a year old. The young stock are all sold within the year, very often by the time they are 8 months old. I send the majority of them out in crates to almost every woolgrower in this country, and a good many of them go to other countries—South Africa, Uruguay, Norway, and so on.

The fine sheep require more feed and more labor than an ordinary flock, for the reason that the ewes and rams shear from 15 to 20 pounds, and it requires more attention to produce that amount of wool than is required by an ewe that would shear on the Ohio average, which would be 7½ pounds. They are so bred that the accretions are forced to produce fleece instead of flesh. The sheep which I sell go to keep up the weight of fleece in the lighter-shearing flocks. They are not mutton sheep.

Commissioner CULBERTSON. Looking at the broader problem, what type of sheep is best adapted to the conditions of Ohio, we shall say, and what has led you to emphasize the Merino type as distinguished from the mutton type?

Mr. CLEAVER. Why, because they are more profitable, taking a number of years. On the amount of food consumed they will shear a greater number of pounds of wool; they will stand close housing and close herding better than the mutton breeds; they are less susceptible to disease; they will stand cold range in the summer better than the mutton breed; they are not troubled with catarrh, as the mutton breeds are in the warm weather, or any kind of weather; and, in short, they are more hardy and are better herders.

Dating back, our people were not a mutton-eating people, as the English people were. We did not use mutton years ago to any very great extent. It was counted cheap. Of recent years this country is using more mutton, and the English breeds have been brought in here and found to be very profitable when kept in small bunches. On our farms here, say, on an average of 100 acres, we can not keep very many mutton sheep. They will scatter over a 10-acre or a 20-acre field like cattle; they do not herd close, and it is not profitable to crowd them at all; they will not bear crowding. Some years ago my father purchased a couple of Leicester rams and a large number of grade Merinos. The Leicester is a crossbreed, you might call it. It happened to be rather a wet summer, which was bad for pale skin, and the Leicester rams nearly all died of the pale skins, the stomach worm. They got catarrh of the head and they were not thrifty at all; in fact, they were not at all healthy under our plan of keeping sheep, crowded, as you might term it, or as we kept the Merinos. You could not possibly handle a lot of mutton sheep in that way. You have got to keep them according to the plan of keeping mutton-bred sheep; you must let them scatter out; you must not crowd them in close houses in the wintertime or they will not do well. Now, that is not my experience. That is taken from observation.

Commissioner CULBERTSON. If a man were to come into this locality to stay, to enter the sheep business, and had had no experience with Merinos, none with the mutton breeds, and had no prejudice for or against the Merino or for or against the mutton type, which line of breeds could he most profitably emphasize under the economic conditions existing to-day in Ohio. I frankly want to know whether the great emphasis which is placed on Merino sheep by some of you gentlemen is an inheritance from the past, let us say, which must inevitably pass as the country develops in other directions. I hold no brief for either the Merino or the mutton type, but I should like to get some light on which type of sheep is most economically adapted to this country, eliminating the prejudice which Mr. A or Mr. B might have against one type or the other?

Mr. CLEAVER. Unfortunately our colleges are educating the young men along the line of mutton sheep. It is my opinion that the colleges have taken up the mutton breeds from the fact that they are all experimenting on feeding, and they want to get something that will bring results to them in the way of meat. The colleges have not given the fleece the attention that they should. Possibly it is not so interesting to the professors and the students to work on the fleece question, because it is a slow proposition; it requires a good deal of study and knowledge to handle fleeces properly and to understand them. On the meat proposition they can handle that in the shape of a beef animal, a hog, or a sheep, and a sheep comes nearer filling the place that they want filled in regard to experiments in feeding in order to get results in flesh. The question of fleece is hardly considered. I am not willing to say that it is a mistake they are making, because I believe that eventually—possibly in our time, but anyhow eventually—this will be a country that will produce 10

times the mutton that is being produced to-day, because our people are fast becoming mutton eaters, and we shall have to go along with the current. I guess.

Mr. CONNOR. What type of sheep do you think is best adapted to the hilly sections of east central Ohio, and why?

Mr. CLEAVER. Why, the Merino, the Delaine; they gather the products of the soil off the hillsides, and in the wintertime they can be crowded into buildings, into winter quarters, and the products of the farm can probably be used up better with the Merino line than they can with any other. It might be possible that they could use all the pasture by pasturing mutton breeds—I wouldn't say that they could not—but whether they could carry them through the winter without injuring them from close housing and close crowding, and go back on the pasture in the summer time and take all the pasture, I couldn't say.

In the nineties I was in Pennsylvania, and Washington and Greene Counties were the two leading sheep counties in that State. I bought wool for eastern men, and I bought it as low as 11 cents a pound. That was in 1893 or 1894, along in there, under Cleveland's administration. Hundreds of thousands of sheep went out of these two counties at 50 cents and a dollar a head. A dollar was the top of the market, and a good many went at a dollar, but there were a great many carloads that went out at 50 cents a head. Millions and millions of value were sacrificed there because they were in debt and they could not afford to keep sheep at 12 and 15 cents a pound for the wool. At that time mutton was not bringing the price that it is bringing at the present time. In 1913 there was but little wool in this country. There was such a shortage that the price was stimulated. The best tariff that this country ever lived under was when there was an embargo on foreign wool during the war. We got real protection under the embargo, and we were supporting ourselves. The foreign-wool market rose in 1913; our market rose with it, and that was followed right up until there was an embargo put on.

Commissioner CULBERTSON. What do you consider to be the paramount problem of the woolgrowing industry in the Ohio section to-day? Is it a question of marketing; is it a question of dogs; is it a question of the feed; is it a question of land; is it a question of breeding; is it a question of other agricultural pursuits coming in and crowding out the sheep industry? What is the big problem of the industry to-day?

Mr. CLEAVER. The most valuable service that this Government could render here would be first to protect the flocks against dogs; second, would be to require the wool to be passed from the producer to the manufacturer without supporting an army of middlemen that has to be kept, a kind of cooperative wool sales. Then follow that up until the wool is returned to the consumer in clothing, the user of clothing, and not allow any unreasonable profit from the time it leaves the sheep's back until it is returned in clothing. We do not want high profits; we just want reasonable profits.

Commissioner CULBERTSON. Probably stability would be more to your interest than anything else, if it could be brought about.

Mr. CLEAVER. Well, I do not know whether that would just cover it or not. We want protection first. In the country where I was raised the sheep business was driven out by the miners' dogs, up in the Monongahela Valley, where there are one-quarter of a million foreigners. They all have dogs up there, and the woolgrower could not law against them, because they do not care for any law. They are a dangerous element. The best thing to do would be to do as I did, simply sell my farm and move out. Hundreds of others did the same thing.

Commissioner CULBERTSON. Do I understand that the members of the association consign the wool to your salesmen, Mr. Horkheimer?

Mr. CLEAVER. They consign it to the association, and he sells it as their agent, on commission. Our salesman, Horkheimer, determines when the wool is to be sold. This method of marketing the wool has been satisfactory to the growers in most cases. It is a new thing.

Commissioner CULBERTSON. When was the method established?

Mr. KEETON. It is only two years now since it was organized. One year the Government took the clip, and this year it was on the open market.

Commissioner CULBERTSON. Before that system was adopted how was the wool sold generally in Ohio?

Mr. CLEAVER. The local wool buyers took it up for the eastern wool men usually and just paid cash for it at the time of sale. To give you an idea of how the woolgrower has been used, last spring, in localities where we had no county organization, the local buyers commenced to talk of buying wool at 40 cents. In localities where there was a county organization, and where the woolgrowers were inclined to band together and pool their wool and place it on the market at the market price, the local buyers ran the price up to 50 and 60 cents. The dealers, through their local buyers, made an effort to break up this Ohio Wool Growers' Association. They made threats that they would spend a heap of money to break it up, and they did spend a heap of money. Their local buyers in many cases bought wool at more money than it was worth in Boston in order to establish a price in that locality and to prevent the men from pooling their wool. There were some woolgrowers who were paid more for their wool at home by the local buyers than the wool was worth in Boston, or that their neighbors got by pooling their wool, and that was an inducement to the man to sell his wool at home.

Commissioner CULBERTSON. Are there fewer fine-wool sheep in what is known as the Ohio region to-day than there were in 1910? By the Ohio region I mean southwestern Pennsylvania, the Panhandle of West Virginia, and a portion of Ohio.

Mr. CLEAVER. My belief is that the price of wool has caused the sheepmen to retain their ewe lambs until they are stocked up, and they are carrying more fine-wool sheep to-day than they were in 1910.

STATEMENT OF MR. I. S. KEETON, ROXABEL, ROSS COUNTY, OHIO, PRESIDENT OF THE ROSS SHEEP & WOOLGROWERS' ASSOCIATION.

Mr. KEETON. We are south about 50 miles from Columbus. I am in the southwestern part of Ross County, and Ross County is divided pretty much about like the State of Ohio. The western part of Ohio is not a sheep country and the eastern part is. The southern part of Ross County is sheep country and the northern part is corn. I have 150 sheep now; 240 acres of land; also some hogs and half a dozen cattle. I have 120 acres that we rotate in corn, wheat, and clover, the product of which I use in feeding the sheep and hogs. We are on high land. There are about 120 acres which is level, and that is what we farm, and the hillsides are pastures. We have probably about 35 acres of timber land, and the other is just fair grazing land. The largest number of sheep I have run on the 240 acres was about 300 head, but we always rent a small pasture outside. I think we would be short of pasture with 300 head. We do not make it a rule to buy much feed. Sometimes we may buy a little corn. We feed a good deal of corn. Of course, we have other feed, but corn is the main feed, with clover hay. We mix a little timothy with the clover.

Commissioner CULBERTSON. Have you ever tried the mutton breeds at all?

Mr. KEETON. Yes; to some extent, mutton rams on Delaine ewes when wool was about 10 or 15 cents. That was before 1895. I don't remember the date, but I do remember that we bought 75,000 pounds of wool down at Vinton, and there wasn't any of that wool that cost us over 15 cents—washed wool. There was no unwashed wool at that time that we paid over 10 cents for.

Commissioner CULBERTSON. You spoke of the low price of wool as having led you to introduce mutton breeds. What price do you have to get for your wool to make it profitable to maintain the fine-wool sheep? Let us take first 1910.

Mr. KEETON. In 1910, I think, we could make more money at 30 cents than we can now at 70 cents, everything considered.

Commissioner CULBERTSON. Would you rather do business under costs and prices of 1910 than under costs and prices of to-day?

Mr. KEETON. Yes; I believe I would. I believe I would get more out of the sheep in spite of a bigger investment in the sheep to-day. I am speaking of the fine-wool sheep. Our section is the fine-wool section. Of course, there are some open wools, some coarse wools, but the majority of it is fine wool.

Commissioner CULBERTSON. Where do you market your wool?

Mr. KEETON. Well, I used to buy wool myself every year, but we have cut that out. We handled wool for Luce & Manning, but they are both dead now. Also for Phillip Good & Co. My clip always went to my principals with the rest. I I have stopped buying and have been selling my clip to local buyers of late years. They may be from Philadelphia, Boston, or different places. During the shearing season the buyers come out through the country and see the individual growers and make offers for the clip.

Commissioner CULBERTSON. Is the woolgrower in Ohio a heavy borrower at the banks?

Mr. KEETON. No. It is a too uncertain business. He can not take the chance of borrowing money to produce wool. He owns his own flocks, his own land, and produces his own crops. He may be in debt $10,000 for his farm, but I do not know of any man who is willing to borrow money and put it into sheep, on account of the uncertainties.

Commissioner CULBERTSON. What do you pay now for shearing?

Mr. KEETON. Twenty-five cents this season. The 25 cents a head includes the tieing. After 1900 I myself sheared thousands of them at 5 cents. I did not tie at that price. The tieing was generally worth about a cent. One gentleman gave a figure of 10 cents in 1910, and 4 cents for tieing, but that would include the board. I think in 1910 it ran along about 8 cents for shearing. We never counted anything for the board. We always board the shearers.

Commissioner CULBERTSON. What did you pay for ordinary labor in 1910 on the farm?

Mr. KEETON. If we had a man and furnished him a house we gave him about a dollar a day and cow pasture, a house and garden, and probably gave him a couple of fatted hogs. To-day we would give him $2 and $2.50, and in harvest time he would charge $4. I would still furnish him the house and hogs. Labor is about double now, as a rule. I think in our section the harvest hands got more than double. In 1910 a man would work 11 to 12 hours, but now they draw the line at 8 or 9 hours, so that he really gets more than twice what he did at that time for the same amount of work.

Commissioner CULBERTSON. Is the tendency in your locality toward Merino sheep?

Mr. KEETON. Well, in our locality it is virtually the same. It has been a Merino locality right along. They haven't changed it much. It is pretty hard to teach an old dog new tricks. We have been in the Merino business a long

time, and we can not change very well. It is too costly to change. After almost a lifetime of watching the drift of the different breeds the old line Merino breeders know better than to change.

Commissioner CULBERTSON. But how about the "new dogs" that come into the business, if I may use that figure of speech?

Mr. KEETON. You asked a question of Mr. Cleaver in regard to the new beginner. If a man should come to me and say he was going into the sheep business, the first question I should ask him would be how much he was going to invest in it. Very often the beginner wants to go into it pretty heavy. I should tell him to get a few Merinos, but that if he wanted to go a little slow and learn the business and grow up with it, to get a few open wools. I think there is as much money if you only have a few coarse-wool sheep. If a man goes into the sheep business on a large scale he can reap a greater profit from the fine-wool sheep, but I think if he goes into the business pretty extensively and does not know the business, that he won't make very much profit out of any of them. He will sink what he has in a few years.

Commissioner CULBERTSON. If a man is engaged in general farming and wants to have a small flock on his farm to forage, he had better not take the Merino, but some mutton type?

Mr. KEETON. I should just as lief have the mutton type. I believe that I should prefer to have the mutton type, half-blood type. The coarse-wool sheep in our section generally comes from the West. They breed them to Delaine rams, and they get a half-blood lamb for feeders. They are considered the best feeder lamb on the market. I think the half-blood is better than a coarse wool.

Commissioner CULBERTSON. If you did not have sheep, would there be any other way in which your land could be utilized effectively?

Mr. KEETON. Yes; we could pasture cattle, but we would have to have better fences. Anything most will turn sheep, but it will not turn a steer. You need a higher fence for the cattle. We usually use about a 10-wire woven fence with one barb on top for everything.

Commissioner CULBERTSON. Have you any general statement that you would like to make with reference to the problems that we have discussed here to-day?

Mr. KEETON. I have made an estimate of what I think it costs us to keep a hundred head of Delaine sheep a year.

Commissioner CULBERTSON. We should like to have that.

Mr. KEETON. I have tried to be very conservative, but if I have estimated anything too high, I should like to have some of these men here correct me. This is figured on the basis of 100 sheep, 60 breeding ewes, 20 yearlings (ewes), and 20 ewe lambs. We do not breed our yearlings.

I figure pasture for seven months at 20 cents, $140. Then we reserve some of our best ewe lambs each year, probably 20 head out of 50 head of lambs. We usually feed our lambs and shear them early and then let them go, but I figure the sale of 30 lambs at weaning at 50 pounds, 10 cents a pound. The ordinary run of fine-wool lambs probably won't run above 50 pounds at weaning. Then we take off a like number of our older ewes and replace them with these 20 ewe lambs to keep our flocks stationary. We figure a sale of 20 old ewes at $6 each, or $100, and then the sale of the 30 lambs at $5 each, or $150. Seven months is fully as long as you can count on pasturing. Some years we commence feeding in October. We feed a good deal of corn. We feed it on the ear, and we aim to feed on an average of an ear a day to a sheep for five months. We bought some corn at $1.50 a bushel, which makes 200 bushels of corn at $1.50, or $300, and 20 tons of hay at $25, or $500. Then we paid a man 5 cents a head for tagging or $5, and we paid him 25 cents a head for shearing, or $25,

for the 100 sheep. Then we sold off of that 100 head an average of 10¼ pounds of wool per head, at 70 cents a pound, or $717.50. I have not taken into consideration depreciation of buildings, interest on investment, and nothing for the work of handling the sheep, except what I hired done, and I have taken nothing on account of sheep being killed by dogs or anything of that kind.

Pasture for 100 sheep for 7 months, at $20 a month	$140.00
200 bushels corn, at $1.50 per bushel	300.00
20 tons hay, at $25 per ton	500.00
Tagging 100 sheep, at 5 cents each	5.00
Shearing 100 sheep, at 25 cents each	25.00
Total	970.00
Sale of 30 lambs, 50 pounds, at 10 cents, $5	150.00
Sale of 20 old ewes, at $5 each	100.00
100 sheep, average 10¼ pounds wool, at 70 cents	717.50
Total	967.50

Commissioner CULBERTSON. Is there any other point you wish to comment on?

Mr. KEETON. A great deal has been said about the advantages of keeping the coarse-wool sheep and the fine-wool sheep. In western Ohio and northern Ohio they have mostly the coarse-wool sheep, for the simple reason that they have only a few. They have corn land, and they keep a few sheep as scavengers, as a rule, rather a side issue, and it is all right for them to keep the coarse-wool sheep. In the northern half of our county there are very few sheep kept. We live on the first elevation, practically, from the Lakes, and the northern part of our county raises nearly altogether corn and hogs and the southern part mostly sheep. It depends on the kind of country you are residing in as to whether you run fine-wool or coarse-wool sheep. The coarse-wool sheep are not kept altogether as a farm crop, we might say, because they can not be bunched up like the Merino sheep.

I think another reason that we want to keep sheep is that the sheep will lie on the highest point, and we get the benefit of that fertilizer there which will come down the hill. When we have cattle the cattle will go into the low bottoms, where the fertilizer is not needed. That is one reason why, if you keep sheep on a pasture for 20 or 30 years, the pasture will gradually drift into blue grass, and that is not true of cattle pasture.

STATEMENT OF MR. W. W. REYNOLDS, REPRESENTING THE OHIO SHEEP AND WOOL ASSOCIATION, UTICA, OHIO.

Commissioner CULBERTSON. Mr. Reynolds, why is it that such a small percentage of the wool is sold through the association?

Mr. REYNOLDS. It is very probable that you do not understand the inertia there has been among the sheepmen. They have the deadest set of fellows you ever saw until lately. That applies to marketing. For 11 months in the year we have felt just as good as anybody, just as big, just as intelligent, and just as strong, and just as conceited, though we do not say anything about it; but the minute we have wool to sell we are not [indicating] as long as your little finger. The system we have had of selling wool has been different from the system of buying anything else on earth. We all had our own business to attend to; we worked six days in the week and sometimes more. We were surprised that we got as much wool as we did in Columbus this year.

Americans keep a few sheep from habit, or because they like a few about, or they have the barns. They keep them as a by-product, as a town housewife keeps a few hens on her table scraps, and we grow a little wool while every other production is spilling over our boundaries. The number of sheep on the western plains is decreasing for some of the same reasons as they are elsewhere, and the rolling lands, the hills, and mountains of the East in places are nearly devoid of sheep because uncertainty deters investment. What few there are are the prey of dogs, since no one has respect for sheep and their misguided affections have turned to dogs. The sheep industry is the most uncertain, unreliable, and unsatisfactory business in America. The deficit of wool proves it. It shows there is no money in it.

A tariff on wool will make some change. It will make the turn. Every sheepman will begin to take heart when he sees protection is coming to his sheep, and tens of thousands will invest in them and start wool growing. Here are thousands of square miles better fitted for sheep than anything else, and rolling lands, hills, and mountains crying for sheep to redeem and beautify them. Protection will make hope spring in the breasts of multitudes of landowners, and this area will be employed. With no stimulus the sheep will dwindle as in the past.

STATEMENT OF HON. J. O. COCHRAN, MEMBER OF THE STATE LEGISLATURE.

Mr. COCHRAN. My home is in Allen County, Ohio, where I was born and always lived. My post-office address is Spencerville. I am interested in the sheep industry in a small way, as a part of general farming. The sheep industry is a minor industry with us, and, in fact, it is more of a minor industry at the present time than it was 35 or 40 years ago. The reason is this: The county seat of our county is a growing town. It has got to be a town now of 60,000 population and uses quite a good deal of milk, and many people have gone out of sheep raising in recent years and gone to producing milk because there was a demand for it, and they could make more money out of cows than they could out of sheep. The dairying has tended to drive the sheep out.

This is general all over in our county and adjoining counties in the northwestern part of this State. Of course, our country there is grain country. It isn't a pasture country. It is corn land practically. We raise corn and hogs and some beef cattle, too—and the dairying business. And the sheep find a minor place on our farms. In fact. I keep a hundred-odd ewes on a farm of 320 acres. I have possibly 40 or 50 acres that we call permanent pasture land. I found sheep profitable, or I think they are, or I wouldn't continue to keep them. I have Shropshires. They produce three-eighths-blood wool for the market. I have a greater per cent of profit from the lambs. The wool is a minor crop in the sheep business with us.

We had a few settlers in there from Harrison County a number of years ago who raised and kept quite large flocks of fine-wool sheep. Those old gentlemen died, and there is no one now keeping fine-wool sheep in our part of the country at all. They made the sheep business their main business, really. The sheep proposition is a minor proposition with us practically altogether now. We haven't anybody that is making that their chief business. But I should think that the Merino sheep would be more practical, if you were going to make that the major part of your business; I should think so from what I know of them. Shropshires suit me the best because the lambs mature early, and you can raise more lambs from the number of ewes.

Some years we get more than others. We never expect less than a hundred per cent, and usually get from 125 to 150 per cent. This year I marketed 127

lambs from a hundred ewes, and I thought that was really little more than an average. I don't have any lambs come until the 1st of May, and market them in the fall before I feed them any. I don't aim to feed them at all. The weight of the lambs when sent to market depends on the season largely. They weigh anywhere from 70 to 90 pounds. I generally ship them to Buffalo.

My sheep have been paying me, I think, about the best of anything I keep on the farm, considering the labor. I don't know that I could say how much extra labor I must have in order to keep sheep on the farm. It just goes along with the rest; requires a little extra time, of course.

There are quite a few sheep, in small flocks, over my section; that is, what I call a small flock—20, 25; from that on up to 50. We haven't any large flocks. We also have some Hampshires in my section. They are a larger type sheep than a Shropshire; and mixed breeds. Some men have crossed their Shropshire ewes with Rambouillet rams—forming a mixed sheep. Our sheep are open-wool sheep.

We market our wool in different ways. As a rule some local buyer buys it up and ships it to Boston or Philadelphia. I gathered in the wool there for a number of years myself and shipped it east.

Commissioner CULBERTSON. Could you contrast the land in your locality with that of the eastern part of the State? Is your land hilly?

Mr. COCHRAN. No, sir; we have level land. Ours is all farm land, plow land, fundamentally different from what it is in the eastern part of the State. We do general farming. Once in a while some western lambs are shipped in and fed, but outside of that there isn't any feeding done to amount to anything.

If the farming industry in our part of the State of Ohio had any assurance that the wool market wouldn't go all to pieces, the sheep industry would double in our part of the State in the next two or three years without any doubt. But we are afraid, you know, that we shall get back to 25 and 30 cent wool again.

Commissioner CULBERTSON. To what extent does the tariff figure in the thinking of the average farmer up through your locality? How much does he rely on the tariff? Does he look upon it as having been a great boon to him in the past?

Mr. COCHRAN. Well, I never just heard them express themselves that way. But you take everyone that is producing any wool, they are satisfied that a tariff will be a protection to them; that is, it will stabilize in a way, the price of wool. It will increase the price of wool. That looks logical to me. Somebody gets the benefit of it. If the producers in this country didn't get the benefit of the tariff, the fellows that produce the wool would have to sell their wool that much lower in the country where it was produced. It either lowers the price of wool in the country where it is produced or it raises the price of wool here.

Mr. CONNOR. I should like to ask what kind of sheep were kept 35 or 40 years ago in your section when they had so many of them?

Mr. COCHRAN. Thirty-five or forty years ago we had more of the fine-wool sheep—the Merino sheep and mixed breeds—there wasn't very many pure-bred sheep of any kind. There was one time there that nearly everybody went out of sheep. I don't know what year that was. I remember one fellow there that I bought 200 sheep for $200. Everybody was getting rid of them. Everybody wanted to get rid of them, and did get rid of them. The price was low, and it didn't pay to keep them at all. And then when the prices got better they got to building up a little again. Now, we have double the number of sheep that we had four years ago. A flock of sheep is something that you can increase very fast. The fine-wool sheep never came back in our country.

Those that did come back were coarse wool. They came back in small flocks. We just run these small flocks of coarse-wool sheep to clean up fence corners and the lanes and graze on the harvest stubble and clean up around, and incidentally feed them through the winter and get a good lamb crop and a good return. We really don't know what it costs us to keep them, and keep no line on them at all.

STATEMENT OF MR. G. A. ICKIS, ADENA, JEFFERSON COUNTY, OHIO.

Mr. ICKIS. Adena is in the eastern part, bordering on the Ohio River, in the fine-wool section. I have 175 "C" type Merinos at the present time on 280 acres of land. I have been in this line of business all my life. I tried the mutton breeds once. I couldn't give you the year. It was before 1900. My brother and myself thought we would like to try mutton lambs, so we invested in mutton rams and ewes, and we raised one crop of lambs. We had nice lambs, but we got a fine crop of sheep ticks; because of that we quit the business.

Commissioner CULBERTSON. Is it not common to dip through your country at all?

Mr. ICKIS. I do not know of any person that dips.

Commissioner CULBERTSON. The country over which you graze your sheep is hilly, isn't it, Mr. Ickis?

Mr. ICKIS. Yes, sir.

Commissioner CULBERTSON. Is it adapted to agriculture at all? Do you have any meadow land?

Mr. ICKIS. Yes; a certain part of it is meadow land. The crops that we raise on the meadow land we feed. If I didn't have sheep, the hilly land and the pasture land is adapted to cattle, I think. I run 15 to 25 head of cattle on it. I do not think the cattle would be as profitable as the sheep, assuming that the sheep were to be taken off entirely. I never figured it out.

I might say that our business is feeding sheep, not raising them. I do not raise any lambs. I buy up sheep in the fall and feed them through the winter and sell them in the spring. I purchase the sheep from other growers in the same locality, feed my crops to them, and then ship them out in the spring. I try to get a "C" type, as smooth as possible. I haven't very much use for mutton sheep. I think there is more profit in the fine-wool sheep for us. Sometimes I keep 50, perhaps, younger wethers over in the spring. We used to keep ewes and raise lambs. We had to make a change on account of dogs. By buying in the fall and selling early in the spring we escape most of the trouble with dogs. We have them in small fields near the sheep barns where they are fairly well in sight all the time during the winter, and, after the 1st of December are always put up at night. In our part of the State it is a common practice for men with surplus grain and hay to buy finewool wethers and feed them through the winter and sell them after shearing in the spring. Some years, though, part of them are fat enough to sell in the spring. We generally carry those over and feed them the next winter. We try to run cattle on our pasture in the summer time.

We like to buy the wethers at 3 or 4 years old. We like to run them off before they get 5 years old, if possible. In the old days they sometimes used to run them 6, 8, and 10 years old. We don't like to buy anything over 4. That makes them pretty near 5 when they are sold. Sometimes they run a few old ones in on us. A 4-year-old wether will fatten up quicker and better than a 3-year old. A 3-year old will keep on growing. After they have been kept for their wool for a number of years, they sell them to me and I fatten them and then send them to market.

[illegible]

[illegible]

[illegible]

the present. I only know of one Merino flock now maintained in our

oner CULBERTSON. Could you survey the general sheep situation in Wisconsin as a whole?

RROW. Yes. Sheep are starting in on the cut-over land. There are s. I prefer to call them sheep farms. The growing of winter feed at deal in connection with sheep ranching. There are those two sheep on the farm used in mixed farming, and the sheep on s that are being established, large sheep farms, where the sheep he main feature.

ot developed to as great extent, I think, in north Wisconsin as it in Michigan. Still there are a number of establishments, because farmers have large tracts in there. You could draw a line through out halfway from north to south and the north half has got these

ere is a future for the extension of the sheep industry in that part We have a large amount of rainfall, but it is rolling land, and eared of the brush and timber and seeded to the tame grasses the l quickly, but with the roughage that has been left after taking r the water is held on the levelier lands, and those lands at times et. I have one sheep farm in Taylor County, Wis., where the inches. Parts of it that I have developed and gotten into pasture dry and we have no trouble with it. It is all right where it is is wet in the woods. One objection which has been made is that densely brushed that with the dew and the rainfall the sheep l have their fleece wet practically all the season. That is true but it is not true on the cleared and seeded pasture. A large part rming country, and will be a general farming country. Sheep main will become as it is in southern Wisconsin now.

development of the dairy industry in Wisconsin has had a with cutting down the number of sheep in the State in the older onsin claims to be the leading dairy State, according to Govern- and, naturally, the cow has crowded the sheep out on a majority I would say, although the labor question seems to be bringing s and lessening the dairy herds. I think the high price of wool ne people to go into sheep husbandry; at least, I have heard remark—that wool is at a good price now, and I am going to -although to my mind wool is a secondary consideration in our State. A great many have overemphasized the importance of the sheep back on the farms.

CULBERTSON. That tendency has not gone to the extent of the e Merino, however, has it?

No; not in our State, although it has induced some of those ction of the breed to select fairly heavily wooled sires—the ires of the Down breeds. These men in buying sires pay con- n to the wool that they are carrying, with the idea that they k that will produce pretty well in wool, both in quality and

fattening lambs has developed in the State to some extent, extent that it has in Iowa, but a good many lambs are fattened half of Wisconsin, and the fattening of lambs is gradually d. Nearly all lambs are marketed in the fall. They are oth of the meadows and the grain fields. Then they are put in a good many cases. They are followed up with hogs to

clean up waste grain. The lambs that are used in that sense, when brought in in any quantities, are western lambs, bought in South St. Paul, Omaha, and sometimes in Chicago.

There are some losses in permanent form from parasites and intestinal worms, tapeworms and lungworms. The worst loss is where the flocks are pretty large and they are pastured on the old pastures year after year with their lambs.

In our immediate section—we are in the summer-resort district—the early lambs for local use are quite in demand. The lambs are sold from the small flocks there in the months of June and July, when people are at the summer resorts. The bulk of the lambs come to Chicago in carload lots from the southern half of Wisconsin. From the southern part they are marketed earlier, in September and in October, and in northern Wisconsin a little later, because the lambs are born later and do not get to a marketable size until then.

Most of the wool has been sold to local buyers, though the Society of Equity has gathered in a great deal of wool in a half dozen different warehouses in the State. It sells that wool to representatives of some of the eastern firms flat, right from the warehouse. There has been some shipped this year to the warehouse here in Chicago and sold cooperatively. There is a movement on foot now to organize for cooperative selling. A meeting was held at Madison a few days ago, and a committee appointed to take that matter up. The Wisconsin Sheep Breeders' Association, in connection with the Wisconsin Live Stock Breeders' Association and our State Department of Markets, newly established, is back of that movement.

Taking the State of Wisconsin as a whole, wool is considered a by-product and mutton a primary product, although a great deal of thought in the last two years, on account of the rise in price, has been given to the wool. In years past in northern Wisconsin a great many men brought sheep in there to debrush their lands. As soon as the brush was cleared off some of them took up cattle and other general farming and got rid of their sheep. Most of the men who began using sheep in the northern district, or the majority of them, I will say, are still keeping sheep, and I think as they have cleared their pastures they are keeping more. We have customers who have been buying rams of us in the northern district for 15 or 18 years. The debrushing of the land by sheep in some cases has proven quite successful where the land and brush were of the right kind. In other cases it has proven disastrous where the land was wrong. Where the land had too much timber and the coarse natural grasses grew excessively, there was an excessive amount of moisture, and where people put sheep in on land of that kind, hoping to reap a reward, they lost. But in all cases where good judgment has been used in developing these pastures and in developing sheep in a general way those men are keeping right on.

The average size of a flock is a very hard question to answer. I presume the average flock of Wisconsin is between 80 and 100 head. They run all the way from half a dozen to going on several hundred, and I think an average might be struck between 80 and 100 head. The Wisconsin men have docked and castrated their lambs pretty generally. There are a great many places where they do not do it, but they are improving in that respect. I think it is more generally done in the southern half of the State so far. It is the men with the small flocks, both North and South—and I think a little more in the North than in the South—that fail to dock and castrate the lambs. The men who have fair-sized flocks nearly all dock and castrate lambs.

As the season grows later, failure to dock and castrate makes quite a difference in market value. In southern Wisconsin, where the lambs are sold in the summer-resort market to the butchers there and at the summer hotels, it does

not make a great deal of difference, because they are young lambs and they have not begun to get the bad effect of being a male; but where they are held later and sent to market it makes a difference of from $1 to $4 or $5 a head.

I think that if the men universally docked and castrated their lambs that there would to some degree be a utilization of these native lambs as feeders. This would increase materially the returns that they get for these coarse, bucky lambs that they send to market in the latter part of the season.

Mr. McCLURE. Why is it that your local butchers won't use more lambs up there?

Mr. McKERROW. When I had charge of the farmers' institutes of Wisconsin, we held cooking schools in connection with a large number of our institutes. I guess we introduced that feature, so far as the United States is concerned.

We got one young woman, an English woman, who was very familiar with the cooking of meats, and I insisted that she should have at least one lamb dish at every meeting she held. She complained that it was impossible to get lamb in the small towns where she went. I found out in the city of Madison that there was one shop where you could get lamb. She was demonstrating with the cheaper cuts, to show what palatable dishes could be made of them in different ways. She had different ways of cooking lamb, in the English style, of course. The ladies at the meetings where I happened to be sometimes would comment on it, and say "Why, I ate some mutton"—they called it mutton, but it was lamb nine times out of ten, nicely cooked—"and if I can go home and cook it that way I am going to try it." Some of the women got quite exercised about it, because the cuts were cheap and economical. In some places the butchers began to put it in, but in most places they did not; they have not continued to put it in. It is pretty hard to get lamb in the average village in Wisconsin, in the average butcher shop. I think that is true of butcher shops all over the United States.

We have a local butcher in our village of Pewaukee, an Englishman, raised in Shropshire, England, and he insists on having mutton and lamb in his market. He dresses a lot of lambs for the summer-resort hotels. He will make a contract locally for 20 to 30 or 40 lambs out of one flock, and then do the same with another flock. A campaign of education ought to be carried on to get the people to buy lamb. That would help the lamb market a good deal.

Mr. McCLURE. We are spending $10,000 here in Chicago in a lamb campaign. Of course that is an insignificant amount, and it ought to be $100,000. We have the packers interested in it, and Swift & Co. have put on seven demonstrators.

Mr. CONNOR. Why was it that the long wool did not persist when it came in here as the Merino declined?

Mr. McKERROW. We brought in the long wool and began to cross the long wool with the Merino, and it was satisfactory, but when it came to building up the flocks and keeping them up it seemed that the fleece got too open; they got too "dudeish"; they parted their hair in the middle. That let the moisture get into the backbone. We have a great many winter ranges that are cold, and when the sheep get wet along their backbone you have a lot of catarrh in your flock. I was breeding middle wools at the same time that I was breeding the long wool, and I decided to close out my long wools largely on that account. I have had lambs of the different breeds in the same pasture, and I have noticed that the long-wool lamb will seek shelter; they will get in under the fence or a clump of bushes, while the middle-wool lambs will stay out in the open and feed. I concluded that the cause of that was the rain which got into the long-wool sheep and chilled them. They showed that by humping up their backs. Then they showed catarrh and running at the nose after the cold rains. That is why I discarded the long wool and stuck to the middle wools.

The heavy external fat of the long wools made them objectionable. The butchers did not like the fat long wools as well as they did the fat middle wools, because there was too much tallow in proportion to the lean. That old English butcher at Pewaukee always preferred the middle wool. He may have been prejudiced, because he was raised in Shropshire, England, but he showed me in his market, and my own experience in marketing carcasses in Milwaukee went to show, that the middle-wool carcass had more lean in proportion to the fat. As long as we could keep one cross between the Merino and the long wool we got a pretty good carcass. Everybody's tendency was to keep on grading toward the long-wool standard, and then we got too much tallow in the carcass.

STATEMENT OF MR. S. W. McCLURE, SECRETARY OF THE NATIONAL WOOLGROWERS' ASSOCIATION, SALT LAKE CITY, UTAH.

Mr. McCLURE. Beginning about three years ago, the people who owned large areas of cut-over land in Michigan, Wisconsin, and Minnesota started a campaign in the western country to induce the western sheepmen to ship their sheep to those States, with the idea of having them graze there for an indefinite period of time without any charge, hoping that the grazing would show that the lands were suitable for ranging sheep on a large scale, and with the idea of selling the lands to the western flockmen.

At the National Woolgrowers' Convention about two years ago we set apart a large portion of our time for a discussion of this subject. The cut-over land people of Michigan, Wisconsin, and Minnesota were present, as well as men from Georgia, and I think from Louisiana. As the result of that, a very considerable number of western woolgrowers was induced to send their sheep to Michigan, Minnesota, and Wisconsin for free grazing, with the thought that it would be a successful venture. I have seen a great many people who have sent their sheep down this year, and everyone that I have seen believes that the venture is a failure.

They would ship their ewes and lambs down there in May, and some of them as late as June. These ewes were shipped with the idea that they would be run there throughout the summer and the lambs would be shipped here to Chicago for sale this fall. If the venture seemed a plausible one, the ewes probably were to be retained in that section as a permanent industry.

The experience of those men has been, however, at least generally, that the country is not suitable for the handling of sheep on a large scale. The ewes have gone down there weighing 125 pounds and have come back to Chicago this fall weighing around a hundred pounds. I heard of one outfit where a man claimed his ewes weighed 110 pounds when they went there, and they weighed a hundred pounds when they came out two and a half months later. He told me that if he had kept them there very long he thought they would have disappeared entirely. The president of our association, Mr. Hagenbarth, sent about 5,000 ewes down there. I was in Chicago when they came back, and they were as thin ewes as I have ever seen.

The grazing, in the first place, is not nutritious. They have too much rainfall to handle sheep in a large way; they are greatly pestered with fleas and mosquitoes, and the sheep can not be herded successfully. The sheep have to be taken up there and herded, because on these large tracts of cut-over land there is practically no fencing, and the herders go up with them and try to herd them—not closely, of course, but just keep them within a certain general district. One man told me that he shipped his ewes and lambs up there in May, I think, and he said his lambs never dried off from the time they went there until they got back to Chicago. They have a great deal of rainfall, a lot

of brush, and a lot of very high weeds. It rained every two or three days, and with these weeds and brush the lambs were constantly running against them all the time; and he told me the first lambs that he sent to Cloverland—that is what they called this Michigan territory—weighed that fall 57 pounds, and the same kind of lambs which he kept at home, at Ellensburg, Wash., weighed 72 pounds in Chicago. They have had a considerable loss of sheep up there this year. A good many of our old sheep have died and a great many lambs have died, and the losses in some cases have been pretty high. I do not think the experiment will be repeated. I know that the fellows that tried it this year are through.

If the stumps can be cleared off of the land, the land cleared, and native grasses seeded sheep will do as well there as they will in the farm States. I do not condemn the territory as sheep country, except that it is not sheep country in the present stage of its development. I do not think there is any hope of establishing sheep raising on a range basis. I do believe there is no reason why the sheep should not do as well there, when the timber is cleared off and the brush removed, as they do in any of the farm States.

The experience in the South is practically the same. The National Wool Growers' Association two years ago sent a committee from the international meeting down to a place called Bogalusa, La. The committee went down there upon the invitation of one of the large lumber companies. They assured us that they had a world of grass and nothing to eat it and that undoubtedly the sheep would find a new haven.

We appointed a committee of four men, who were some of the best sheepmen we had in the West. They came on to the international meeting and went to Louisiana and looked over these lands. They saw a world of grass, more grass than they had ever seen in their whole lives before in the western country. It was a very rank, big growth of grass, and they thought, of course, that no animal in that country should be thin in flesh at any time, and yet the live stock that they examined in that country were skin poor. They found cattle in those grass pastures that could not get up, they were so thin; yet they had just worlds of grass all around them. They saw a lot of sheep in small bunches here and there that seemed to be lost in this dense pasture, but when they were able to catch one of them they found he was simply skin poor. They rather condemned the proposition.

They made a report to our association that while there was feed there and lots of open grazing land, they thought it was entirely too wet, and that the grass, while heavy and very rank in growth, contained no nutriment. However, a gentleman living in Texas was later induced to send, as I remember, 5,500 head of sheep over there to this same section. He sent them over there and ranged them in herds for a few weeks. I do not know how long it was, without looking up the correspondence, but he lost a large part of his sheep. It was not just a question of the sheep not doing well—they died. He loaded up what were left and shipped them back to Texas. That gentleman told one of our people that no one could ever be justified in recommending that as a sheep country, and I rather think his experience justified that assertion.

Of course the Bureau of Animal Industry took the position that the sheep had been herded too close and that they were dying from worms. That, of course, was just their statement. If they are herded at all they have got to be herded close, and if they had not been herded at all I think the result would have been the same. I think the result shows plainly that it is not a sheep country. I believe that if all this territory is cleared up, the brush removed, the grass plowed under and seeded, and the pastures fenced that sheep can

be maintained on the farms there as well as they can be maintained on the farm anywhere.

Commissioner CULBERTSON. To shift to another phase of the industry, Mr. McClure, there is quite an industry in the Middle West which consists of feeding western sheep, is there not? Can you just give us the steps through which that industry proceeds from the time it receives the sheep from the ranges until it markets them?

Mr. MCCLURE. That is the industry that our sheepmen in the flat-range country depend on for market. Take Utah. Utah does not produce many fat lambs, except just in the territory where they have mountain pastures. The lambs come off the deserts and out from the flat country as feeder lambs, weighing anywhere from 45 to 62 or 63 pounds when they reach the market. These Iowa farmers and Illinois farmers go down to the market and buy these lambs and ship them out as feeders. They begin buying them in August.

They take the lambs home, and after the corn gets to a certain size they turn them right into the cornfield. The sheep clean off the lower leaves of the corn and they eat the weeds and eat out the fence rows and do very well. They get no grain except such corn as they break down and eat. Those lambs are kept down there anywhere from 30 to 150 days. Most of them are not kept very long. The farmer takes them home and cleans up his pasture or cornfield and sends the lamb back to market. When they come back some of them are fat, but not all of them. Some of the fat lambs go to the packer. However, there are always some thin lambs, which some other farmer buys. He takes them out to his place a little later and pastures them awhile; he then puts them on grain feed; he may feed them corn and clover hay or a little pasture that he has. Of course, this happens in October and November, and he ships the lambs back to market, say, in November, December, or January. Again, in that case, there is a pretty high percentage of fat lambs, but they are not all fat. There are always some feeders there. If there are enough of them, they are very apt to be purchased by some other practical sheep feeder, who takes them back and finishes them and finally brings them in here for final disposition.

The State of Iowa, in my judgment, fed more lambs this year than any other State in the Union. Ordinarily that is true of Colorado, but I think this year Iowa has fed more. These men insist on feeding western lambs. I do not think that it is at all practical to fatten the buck lamb. But the main reason why the native lambs are not fed by the practical sheep feeders is that they are wormy and can not be fattened. So far as I know no native lambs, even where they are castrated and have their tails off, go out as feeders. Out in Idaho I won't feed the native lamb. I won't feed my own lambs. I am speaking of the native farm lamb.

There is a very broad question there as to which lamb is really the best feeder. You will find feeders that would rather have Rambouillet lambs from New Mexico than any other lamb, but the man who is going to make a short feed as a rule desires the black-face lamb, the mutton grade lamb.

The man who is going to make a long feed, which is generally the one which is profitable, wants to buy as light a lamb as it is possible to obtain at purchase time. The reason is that a lamb after it gets to weigh 85 pounds on the market is looked on as being beyond the prime, lamb stage, and the packers begin to dock for excessive weight. They would always dock for excessive weight if there was much competition on the market at that time, so that a man that has lambs weighing 90 to 100 pounds has not very much chance of topping the market here. Therefore you can not put a heavy, big lamb in and start to feed it. The highest price for lambs on the market, fed lambs, is generally between he 1st of March and the 15th of May. That is when the money is made, pro-

vided you have started with a lamb that was light enough when you put him on feed, so that by the 1st of April or the 1st of March he will still be light enough, considering the fat he has taken on, to fall into the lamb class. For that reason the Merino lambs and Rambouillet lambs are pretty popular among the very good feeders, because they can get lighter lambs to start with.

Our old ewes are fed to a considerable extent, especially around the sugar-beet factories—fed on beet pulp and sirup.

STATEMENT OF MR. JOHN D. HOLLIDAY, PRESIDENT OF THE NATIONAL WOOL WAREHOUSE & STORAGE CO., FORTY-THIRD AND ROBEY STREETS, CHICAGO, ILL.

Mr. HOLLIDAY. I am president of the National Wool Warehouse & Storage Co., which was organized some 10 years ago as a cooperative woolgrowers' marketing agency. It is incorporated under the laws of West Virginia, with a working capital, including cash and real estate, of practically $500,000. Its control and direction is in the hands of western woolgrowers, in the form of a board of directors. The by-laws provide that a majority of its 15 directors shall be western woolgrowers; also that the president must be a western woolgrower. The organization was brought about with the hope of bringing into operation a better system of putting up wool and marketing it and to eliminate as far as possible the speculator and the unnecessary number of middlemen in the distribution of the wool from the grower to the mill.

The way in which the wool was marketed through the large eastern wool-houses was not satisfactory to the western growers. The wool, for the most part, was bought by speculators and handled and solicited on consignment by the same houses, in many cases, the same houses buying as well as handling the wool and selling it, which resulted in an unsatisfactory condition for the woolgrower. The woolgrower was never informed; he never knew the open-market value of his wool; he seldom knew its grade, its condition, shrinkage, etc., which are determining factors in ascertaining the value of wool. The wool, in the final analysis, is always bought by the mills on the scoured content and graded.

The system under which we grade the wool is known as the American system.

Commissioner CULBERTSON. Will you just describe the grades and give the reasons for selecting those grades?

Mr. HOLLIDAY. The system which has been in vogue in the United States of grading wools by the eastern trade and the mills themselves has followed broad American commercial grades such as fine, fine medium, combing, fine clothing, fine medium clothing, half-blood combing, half-blood clothing, three-eighths blood combing, quarter-blood combing, low quarter combing, and braid. There are clothing grades attaching to the three lower grades of three-eighths, quarter, and low quarter, but they are not often made. They are the old grades. They have always been in use by the American mills; that is, broadly speaking.

When the quotations speak of Ohio wool they define a condition of fineness and breeding. Take Montana sheep bought in the fall, brought to Ohio and wintered and sheared in the spring, and the wool is for the most part sold as Ohio wool. It is very difficult to detect the difference. Montana wool has a superior condition and market standing as against Wyoming wool and Idaho wool, because primarily it was bred along better lines of Merino blood. The range is more of a sodded country, showing a difference of grasses, climate, etc. Each of these things are always, if not determining factors, at least contributing factors in the production of superior or inferior grades and condition of wool.

The larger part of the wool received by the National Wool Warehouse & Storage Co. is in the original bag. A part of it is put up into these above-

described grades by men who are sent by us to the shearing sheds in the West. After the wools are put up in those grades at the shearing sheds in the West they are received and sold direct to the mills without being rehandled, for the most part. During the several years which we have handled it these grades have been readily accepted as standard grades by many of the leading mills.

We have received each year more or less shipments put up on the Australian system. They have sent their wool to us as selling agents. Our finding of the Australian-put-up wools is that they have made excessive classifications in sorting the individual fleeces, resulting in the making, in our judgment, of technical distinctions in wool, with very little, if any, commercial value attaching.

Commissioner CULBERTSON. Do you think as the American mills specialize more and more on particular fabrics that greater classification will be found necessary than is found in the American system?

Mr. HOLLIDAY. That will apply largely, in my individual judgment, to the breeding of the wool. As long as we continue to breed a combination of mutton and wool sheep, as seems best adapted to our western ranges, the larger part of our western wool tonnage will be wools of average character and condition, from which no special commercial advantage will be derived by an attempt to sort the individual fleeces at the point of origin. If the wools were more highly bred along specialized lines until they had arrived at a point of being practically standardized as to grade and condition on the sheep, there might be justification in skirting more body sorts of the fleece at the point of origin when the wool is put into the bale.

The grading under the American system consists simply of taking off the tag ends and then classifying the whole fleece. The assumption is that there is not enough difference in quality in the different parts of the fleece to justify the expense of separating; that is, that you would get classifications without representing any wide difference of grade or condition of fleece. As against our making about six or seven broad commercial grades at a place, say, like Rawlins or Caspar, Wyo., or Rock Springs, the Australian system would have in mind the making of from 16 to 20 grades. Those grades, by which the Australian system exceeds the American system, would be chiefly in the body of the fleece. In the marketing of these Australian-put-up wools, with which we have had to do, we have endeavored to place the matter up to the buyers for several of the leading mills in the vicinity of Boston and Philadelphia. We have grouped into lines the various Australian classifications for the same price. In the discussion that developed their contention was that these different classifications practically represented one broad grade; that there might be technical distinctions, what you might call on the low side or the high side of a broad grade, but by reason of the average condition of the wool to begin with, there was no commercial advantage to be had in paying a higher price or a lower price; that when the wool went to the mill they would put all of those different classifications into the scouring tank at the same time. In going through these wools with them—and I have done that with their salesmen—it struck me at once that when attention was called to these numerous classifications put upon the different bales that it required a very capable expert in spinning terms to detect any difference.

Wool, as it comes from the West toward the East, often gains in weight, depending on the weather and other things at the time of shearing. For instance, this year we have handled several million pounds of farm wools and the climatic conditions in these farm States at the time the wool was shorn had a great deal to do with its condition. There was dampness and humidity in the atmosphere, the grass was rank and green, and the sheep were improving in condition

rapidly. In instances where the wool was apparently dry it came under our term of being "green," and when the wool was shorn and shipped, shrinking began. Our average shrinkage on the tonnage of farm wool has been about 4 per cent, which was owing solely to the fact that the wools when they were shorn, by reason of the condition and the season, were green, and when put into a dry warehouse the shrinkage began. The opposite of that was the condition in the western part of the country. We had a uniformly dry spring and shearing season, and the wools were very dry. The wool was seasoned, not green, and when put into bales and shipped into a cool, well-ventilated warehouse, such as you have seen here, Mr. Commissioner, I should say that 75 per cent of those wools have shown a gain in weight. For instance, take 800,000 pounds of Utah wool and the gain in weight represents about a cent and a half a pound. The Wyoming wools will show possibly about the same thing. I think the Storage & Warehouse Co. has been the only selling agent which has uniformly returned any gain in weight to the owner made on the wool. There may be other houses that do that, but I do not think it is practiced uniformly. I think this year that the company, on the tonnage of western wool which it will handle, will probably return to the growers in excess of $100,000 on account of gain in weight.

We charge the shipper of territory wool a flat rate of 2 cents a pound to cover four months' storage, insurance, loading and unloading, and selling charges. If it is necessary to have the wool graded, we charge an additional quarter of a cent per pound. We have charged the farm woolgrower a flat rate of 2½ cents a pound. All of the farm wools must be graded, and it necessitates an immense amount of additional detail both in the handling and in the auditing. I might mention the fact that out of one graded line of 400,000 pounds there were over 2,000 individual owners, which will explain in part the immense amount of detail involved. Each one of those owners receives a separate statement or account of the sales, of the weight, the different grades, etc.

The grower can determine when the sale is to take place if he insists upon it. We, of course, advise him that the wool will be held subject to his order all the time. Occasionally they do that, but the great majority leave the wool with us at our option as to time of sale.

We have operated in the past with as many growers as we could get to sign contracts for storage on the basis of one share of stock, enabling him to contract storage for a minimum of 5,000 pounds and a maximum of 6,000 pounds. Failing to use the storage after notice was given at a certain time, he paid an upkeep charge, in lieu of using the storage, of a quarter of a cent a pound. If he failed to notify us that he wouldn't use the storage and we held it subject to his order, we charged him half a cent a pound. His shares of stock were held by a trust company subject to cancellation for failure to pay the upkeep charge in case he didn't use the storage. The upkeep charge was based on 5.000 pounds of wool. When he shipped his wool we agreed on our part to store it, insure it, and grade it for 1 cent a pound.

The fact that some of the growers must realize immediately on their clip has limited the amount of wool which we handle, but various factors enter into that. We never have had an open system of marketing wool, as applies in other progressive wool countries. Our handling of wool has been more or less a matter of speculation by wool buyers. Some mills, from time to time, have gone into the country at shearing time and bought wools, but I feel that the woolen mills prefer, as far as risks and the advantages of prices paid are concerned, to let the present system go on. A very well-known buyer told me in my office in Boston a year or two ago, as long as a small group of men speculated in wool and bought it and brought it to Boston, that he could find more "lame ducks"

on Summer Street than he could through the whole shearing season in
I regard that man as one of the nicest and one of the keenest wool
the American wool trade.

Our western woolgrower is passing from year to year from the m
nomadic condition to one of investment of capital in the way of
land, leases, and adding permanency to it as an investment undertak
necessarily involves a more or less large outlay of money above the
of handling the sheep on the range, in the way of herding, shearing
industry as a whole has been for some years, and I think will be for
years, in need of a more or less amount of ready money and will be a
dustry that will carry a more or less large amount of borrowed m
vide for the requirements of its investments in the purchase of
That has been very well brought out in the wool industry of Montana
passed from the condition of the open range to one of an investment

The buying end of the wool trade has been quick to realize the adv
bargaining for wool on the sheep's back, because of the need for m
local banks, through which the majority of local woolgrowers oper
surplus during the fall, but there is a steady drain on their accounts
the winter, an excessive drain in the early spring on account of addit
for lambing and shearing, and the local banks, while able to carry th
often regard as especially welcome any additional money that the local
get and bring into the coffers of the bank in the way of an advan
does not apply to all western banks, but I am merely speaking of it
has been a potent factor in keeping the marketing of our western w
cially in a speculative condition. Then, we have the large sheep m
West who is a speculator. He is buying a line of stuff and winter
getting the wool off in the spring, and he starts with a large amou
rowed money from the bank or one of the large wool houses. Then
wool is practically consigned long before it is shorn. That has been a
in the way of the warehouse getting a larger tonnage of wool fro
people who, I believe, feel kindly toward the plan as a whole and wh
if they should ship wool to any reputable handling agent they w
better average price, one year with another, than they do; but they fe
son of the speculative chances, buying sheep, buying a cheap piece of
a new ranch, that the discount they take on their wool is to their a
The plan has been suggested that the Wool Warehouse Co. extend
adding to its capitalization in order to loan money in the above manner
that would have its advantages and its conveniences, it involves rather
deal of financial risk and obligation. So far it has not been done.

With regard to the cooperative movement in the marketing of w
farm States, I feel that the solution of cooperative marketing of w
cidentally other so-called raw-material products, foodstuff, and so for
be worked out by, and its future rests with, the farmers of the Unite
and not with the western woolgrowers. I think that the farmers w
absolutely necessary to concentrate production and distribution in a b
tem of marketing, because when it is handled individually he is mo
mercy of the buyer. His product passes through more middlemen t
product of the western woolgrower, who, by reason of his larger pr
and the individual character of the man himself, is better able to prote
terests.

This view is supported by the admission of dealers who have
fleece-grown wools for a number of years, one year with another, th
amount of money has been made by dealers handling fleece-grown w
contention is also supported by the fact that there is quite a large a

money in excess profits which is now being held by the Department of Agriculture, which is trying to find the men to whom it really belongs, which is a hopeless task. The irony of it comes back to this, that many of these people who lost this money were in a hurry to get rid of their wools, to get it out of their hands, because they thought the Government was going to take it away from them. That is an instance where the Government brought about an improvement in marketing for the benefit of small owners. Much effort was made by the very high-class men to protect the interests of the large group of men who would not be protected.

I believe that the cooperative plan in its inception is very good and will bring about a considerable improvement, such as concentrating the wool of a county in some warehouse to be sold there, or to be concentrated there temporarily and then sent to a large distributing point like Chicago, St. Louis, Boston, or Philadelphia. It would be idle for me to say that there is only one way of doing it. Nevertheless, it is the beginning of a better system of handling farm wools. The movement is in a very preliminary stage yet. I believe that the activity of the association in Ohio and of the farm bureaus in Illinois and Ohio, and incidentally the moral effect that the movement out in these five or six Western States has, have resulted in a vast amount of money being left in the hands of the growers that otherwise would have been found in the hands of a small group of wool buyers.

It is my contention and my firm belief that the safety of our country as a whole is to be looked for in a larger and better distribution of the wealth of the country, of values, and profits of production. I do not think any good is obtained, and I think a great deal of evil follows, when the profits from production of any kind go into the hands of only a few people. Therefore, I earnestly hope that the plan which has been started to bring about a better condition for marketing of wools, particularly as applied to the farm States, will be carried through.

In the handling of several million pounds of wool this year and making a lump-sum charge to the growers, I think we shall lose money; but inasmuch as the warehouse company is never expected to make any money, we might just as well distribute it that way as some other way, because it helps the general movement along. I think it has given us standing and has given a character to the movement that might have been difficult to obtain in any other way. I think it has disarmed to a certain extent the vague suspicions of the grower of a few pounds of wool—that as soon as the wool got out of his hands the control would be lost. Through their own representatives, a certain amount of supervision of the wool has followed it all the way through, and many of them have been very much interested in our processes and in the way in which it was handled in grading. The market price paid has been fair. I have personally been very much interested in many of the individual growers. I have driven them over in my car to spend the day going through the warehouse. I have explained to them how it was impossible to pay for 200 pounds of wool contained in that huge amount of wool until the whole amount of it was weighed, so that we could determine the proportion of shrinkage of the 200 pounds. Without exception, all of them have been very much interested and very much pleased to go through the warehouse.

A great many of the county agents have sent us their wool in bulk in carloads with a memorandum of the individual owners, the weights, and such description as they were able to give. We have always followed these wools through the warehouse, apportioning the amount of money as the different grades have been sold to the different owners, sending the information to the county agents for distribution.

Now, gentlemen, you realize how difficult it has been to handle these accounts in their many details. The pool movement has shown, as no other thing could show, the necessity for farmers to concentrate their wools and have them put into broad grades. The difference in price of different grades of farm wools from a single owner, running all the way through a pool or carload shipment, has ranged from 45 to 78 cents a pound. A man with 200 pounds, and sometimes with 100 pounds, has had such a range in price.

We have had numerous meetings with the county agents and have had 20 to 30 of them at a time spend the afternoon at the warehouse while the farm wools were being handled. We gave the Iowa agents and the Illinois agents offices in the warehouse and they were there every day. They were very much interested and gave a great deal of attention to the details. The warehouse company has tried in every way to cooperate with the county agents from the time the wool has been shorn to the time it has been marketed.

It is my final judgment that the outstanding issues involved in the marketing of our domestic wool clip are largely those of ascertaining the values of domestic grades compared with similar foreign grades; the coordinated effort of producers to steady the market at shearing time with rererence to these values when ascertained; the concentration of their wools at suitable distributing points and putting it up in broad commercial grades which will meet the everyday demands of the mills; the distribution of the wools throughout the milling season as against dumping them into the market by way of speculators immediately at the time of shearing. The growers should assume the obligation of carrying the wools throughout the milling season. That means every month in the year.

Commissioner CULBERTSON. What was the factor or factors which led to the elaborate development of the Australian system of grading?

Mr. HOLLIDAY. Broadly speaking, it was the effort to evade the exactions of our tariff. When our tariff placed a flat price of 10 cents per pound on fine medium wool, with 1 cent a pound ad valorem, making it 11 cents, the importer immediately began to figure how he could get the maximum amount of scoured wool into this country at a minimum tariff charge. No good business man would have overlooked that point for a moment. The American buyers have always been the most discriminating buyers and the most intelligent buyers that have ever operated in the Australian wool market—and their wish has been catered to, because they were spenders and bought high-priced wools. Many of the large stations in Australia which produce high-class wool began to put up the wools to suit the American tariff requirement, and that meant that the heavy shrinkage parts were all skirted, and the body wools were admirably standardized by a long period of most intelligent breeding. The body wools did not require to be sorted, but the heavy shrinkage parts were taken off and made into three or four off sorts. Therefore, when an American buyer bought 100,000 pounds at an average of 20 cents a pound he knew he was going to get a maximum amount of scoured wool in his mill, but he was going to pay a tariff exaction on the grease pound, and had he brought in that fleece with all those excess heavy-shrinkage wools attached it would have reduced the amount of scoured wool for the mill. That was the point considered.

Commissioner CULBERTSON. Am I to understand that the direct and immediate occasion for establishing the Australian system was our tariff regulations? Did not the demand of the English mills for various grades and classifications of wool have something to do with it?

Mr. HOLLIDAY. Yes; but the first skirtings of wool were made to meet the American tariff exactions. I don't remember just the date it began, but 25 or 30 years ago. When I was in Australia the Australian catalogues of well-

known brands of wool carried a marginal note, "Put up suitable for America," which meant that the heavy skirtings were cut out. Then followed the establishment of public auction sales in Australia some 20 years ago in an effort to pull away the market from London. Then, to meet the demands of the Continental buyers, there followed an extended system of classification of wool.

Another thing that entered was the fact, applying to certain individual growers, that there might be years when the skirting of the wool was necessitated on account of the season, the rapid growth of vegetation, and so forth; the hot season coming on and turning all of this vegetation into seed, and the seed adhering to the under part of the wool, the neck and belly of the sheep, necessitating the skirting. That would be more true of some cases than others. Then followed a commercial change that was beginning to be felt very strongly by England as against Germany and Belgium, and it became necessary to make these numerous off sorts of the seedy and burry parts of the wool. Those wools were not sought by either the American buyers or the English buyers, and they fell to the lot of the German and Belgium buyers, who quickly specialized in carbonizing plants handled with very cheap labor. They were content to leave the fine combing wool to the English mills, contenting themselves with this other stuff, with the result, as we all know, that the Germans were forcing the English yarn people out of the world's markets and would speedily have gotten control of our markets had not the war intervened. It developed during the war that Germany held a vast advantage over Great Britain in the fact that she had prepared and established a system under which she was making garments out of wool which the English classed as inferior wool. England realized too late what was going on. When these burry wools came to England to be used it found England without machinery for using them. There was wool brought into this country in Boston that the American mills had never seen and they did not realize there were such wools in the commercial world. They had no means of making these wools commercial in that sense. They were a mass of burrs and all sorts of things. They were a drug on the market for a couple of years. They were bought in Australia at the end of the first period of the war at 4 cents a pound. I saw hundreds and hundreds of bags that were filled with burrs, which were bought at 4 and 4½ cents a pound in Melbourne and Sydney and brought here and offered to the mills at 7 and 8 cents a pound. That wool stood around in Boston for months and months. We have never carried carbonizing to anything like the extent they have done in Germany and Belgium. Germay already had specialized in it. They had been using those wools for years.

STATEMENT OF MR. JAMES F. COUPE, OF CARROLL, IOWA.

Mr. COUPE. I have been county agent for Carroll County, Iowa, since February 16, 1918. I was in Thurston County, Nebr., from May 1, 1913, to November 15, 1915.

In my county we have mostly crossbred sheep of the mutton type. Our people are in the habit of using quite a number of western sheep that they breed to mutton rams. They bring them in in the fall and sort out a number of the better ewe lambs for breeding purposes. The plan followed is this: Lambs are purchased at a live-stock market, principally at Omaha. A man may decide to keep a few ewes out of the number for breeding purposes. The rest of that shipment are fed heavily and perhaps marketed within a period of 60 to 90 days. They are used generally for the consumption of the roughages of the farm. For example, they are turned into the cornfields. The use of cornfields for that purpose is quite general in Iowa. Lambs are bought in the latter part of August and September, about the time the corn is maturing,

and the lambs eat the lower leaves off the corn and the weeds. They eat the corn as it matures. They are finished with a little corn later on. The finishing is really on the grain. They eat a great deal of stuff that would otherwise be waste. Then these sheepmen sort out some of the better sheep. I would really be at a loss to say exactly what proportion of the permanent flocks in Iowa are really from the western stock.

In my county, roughly speaking, we have in the neighborhood of 1,800 to 2,000 farmers, and out of that number perhaps 125 handle sheep. According to the assessor's record, there are something around 3,000 sheep in the county. I would say that we are hardly an average county with respect to sheep. We are below the average, as I know Iowa conditions. I am in the north central portion of the State. The southern part has perhaps about four to five times as many sheep as the northern part, and the sheep industry is very important.

Commissioner CULBERTSON. What are the factors which have tended to reduce the number of sheep in your locality? Has there been competition with other agricultural pursuits?

Mr. COUPE. It is not a question of reduction; it has been a question of lack of development and of encouragement of the sheep industry. The country could profitably carry more sheep. We are doing all in our power to increase the number, particularly the pure-bred sheep of the mutton breeds. It is one of our important duties. The breeds best adapted are those that are commonly used, namely, the Shropshire and the Hampshire. There are, of course, some Southdown and some Oxfords.

Very few of the feeder lambs enter on the assessor's rolls. I do not think there have been two lots out of that county of fat lambs that went on the assessor's rolls. They are bought in the late summer and early fall, and they are shipping them right now. They go out before the assessor makes his return, which is on April 1. When I spoke of the 125, I referred to the men who were keeping permanent flocks. The men that have the permanent flocks are generally the men that do additional feeding, but feeder sheep were not included in the assessor's data I have given.

We adopted a cooperative wool-selling plan in Carroll County this year.

The plan was fostered and encouraged by our State Federation of Farm Bureaus, of which Carroll County is a member. It was left directly in charge of the Iowa Fleece Wool Growers' Association, aided by the extension department of our college at Ames. Carroll County had a meeting of the sheepmen on April 1, 1919, at which time we organized the Carroll County Fleece Wool Growers' Association, of which I am secretary, and we elected officers common to such an asssociation. Meetings were held in different parts of the county, some 8 or 10 meetings in all, at which time speakers explained the method to be followed in marketing our wool cooperatively.

Where the wool was to be consigned was determined by the State Fleece Wool Growers' Association. We were working in cooperation with them and following out their plans. As soon as we determined that shearing was practically completed every woolgrower in the county received notice from my office, as secretary, that this car would be "spotted" on a certain day, and if he cared to he could consign his wool with the other woolgrowers of the county. On about the 23d day of June a car was set out at Carroll and held there for two or three days, at which time about 9,000 pounds of wool was loaded for 33 men and sent to the National Wool Warehouse & Storage Co., in Chicago.

The returns on the wool have not been received as yet, but we have, of course, the general averages. We have a large buyer at Carroll, a speculator, we call him, who buys on his own account. One man told me that he got 32 cents a pound for his wool from this buyer; another fellow got 37 cents, and another

man told me that he received 42 cents. This was at various times during the spring, following shearing. When our car was spotted the price of wool locally went up to 50 cents a pound. There was no change in market price at that time in Boston or Philadelphia that I know of. My reading of the market showed not over 3 to 4 cents variation during the season on the Boston market. I believe the majority of it would have sold to local buyers around 40 cents, and they would have been glad to get that. We are getting 62 cents, and we are figuring on 15 cents profit to our fellows—not only the fellows that shipped, but the fellows that sold along about the time that we spotted the car. Of course, when it developed that we intended to market the wool in this way, the buyer was forced to raise the price to what he did purchase at.

Our previous experience with that local dealer has been that he will start in the spring offering a price of 25 to 30 cents. The price then goes up almost in a saw-tooth curve, regardless of the Boston and Philadelphia markets. They buy as much as they can at the low price, and they start to circulate stories to the effect that the country is all loaded up with wool. Some of the Iowa farmers in times past have sent their wool to the wool dealers, but have not found that satisfactory, because they never knew what they were going to get. This local buyer has a great many agents in that part of the State, and there are also other buyers. There is no question in my mind but what they have taken advantage of the ignorance of the farmer with regard to his product.

STATEMENT OF MR. CARL R. SCOTT, COUNTY AGENT, OTTUMWA, WAPELLO COUNTY, IOWA.

Mr. SCOTT. My post-office address is Ottumwa, Iowa. I have been county agent for two years and a half, but not elsewhere before that time. My county is in the southeastern part. It is quite a sheep country. I can not give you the number of sheep, but there are around four or five cars of wool shipped out. We have seventeen or eighteen hundred farms, and sheep are quite generally kept. There are some flocks of two or three hundred, but the majority of them are small. We have more sheep in that part of the State than in the northern part of Iowa. Davis County adjoins Wapello County on the south, and Davis is the greatest sheep county in the State. The sheep in my county and in the adjoining counties are simply a part of general farming. There is a little, not a great deal, of feeding of western sheep. A few men buy a carload or two and feed them. As a rule the sheep that are kept are year-round sheep.

I think the Shropshire grades predominate; but, of course, they use the Shropshire rams on some western ewes to get a cross. Then there are a few Delaine sheep. The Merino type does not predominate at all in any section of the county. The possibilities of sheep husbandry are greater than the present situation indicates. There is opportunity for the extension of the industry.

In one neighborhood in the county they have gotten the wool together in a pool, and they have been selling it as a carload for three to five years. They were doing it before I came. We shipped one carload this year to the National Wool Storage & Warehouse Co. A year ago in another part of the county there was an association that sold the wool in a carload, and I believe they did it this year, but that was not handled under my direction.

We had one local buyer in the county who handled probably two or three carloads. Of course, some buyers come from the adjoining county. A Bloomfield buyer came up and bought some, and then there are some few fellows that buy in a small way for some outside firms.

STATEMENT OF MR. W. C. COFFEY, PROFESSOR OF SHEEP HUSBANDRY, UNIVERSITY OF ILLINOIS, COLLEGE OF AGRICULTURE, URBANA, ILL.

Mr. COFFEY. The sheep industry in the State of Illinois may be characterized as one of small-farm flocks, as shown by the last census, and averaging about 24.6 sheep per flock, owned by 10 per cent of the farms of the State. I presume that proportion is about the same at the present time, and perhaps a little greater.

The prevailing breed in the State of Illinois is the Shropshire. They are mostly grade flocks. We have a few purebred flocks, but the Shropshire strongly predominates. There are two small centers that are yet Merino in breed—Shelby and Pike Counties, in the south-central and western part of the State. These fine wools are a passing stage of the industry in Illinois, but have been there, I should say—and this is roughly speaking—since 1870. They are going out by being crossed with the mutton breeds. There is a similar movement all through the Middle West. Those flocks have stayed because of the strong personality of two sheepmen. There are a few old-fashioned sheepmen who still stick to the Merino, and it is probably due to their influence that those flocks still remain. There is an old sheep breeder by the name of Killam, in Shelby County, who has stood for the Merino and has been very successful in showing up its good qualities. He has in the county several younger men who are his followers and who have been successful with the Merino flocks, mostly of the Delaine type. The price of wool in recent years has tended to encourage that movement but little. There has been at the same time, of course, high mutton prices, and the primary product in Illinois is mutton.

The farmers who have sheep look upon the whole flock as a by-product, and they look upon the wool as being a by-product of the flock; but I think that they have come to realize within the last year or two the importance of the wool and are trying to drive that fact home. It will modify the breeds, I hope. The idea is this: We can grow beautiful three-eighths-blood combing wool on Shropshire sheep, the prevailing breed in the State, and the people of the State ought to be taught that they can do that and ought to do it, and that it will increase the number of pounds of wool and increase the price per pound. The wool will run three-eighths now. Some of it will run three-eighths clothing instead of combing, and I have tried to get all of the wool into the combing class if I could.

Commissioner CULBERTSON. Has the cooperative movement for the selling of wool spread at all in Illinois?

Mr. COFFEY. We had no cooperative selling of wool worth speaking of until this past season. It has been in such a recent period that you can not figure the movement with any great degree of confidence. It has developed in a very satisfactory way, if it can only be kept up, by the counties pooling their clips. The Illinois plan consisted in putting the question before the State Agricultural Association. The secretary called a conference of the county agents of the State. Mr. Holliday, of the National Wool Warehouse & Storage Co., agreed to handle the Illinois pools on a commission. It was not entirely a movement on the part of the State organization of sheepmen, but a movement within a larger body of agricultural county farm bureaus of the State, and is a much more significant movement than if we had formed an association in the State for the handling of wool. These people are interested in all the questions of agriculture, and they can bring to bear upon the marketing of wool some of the principles that they may discover in the marketing of their farm products, and they can go to work more intelligently than if the movement was restricted to an organization of purely woolgrowers. What would be best for Illinois with its few scat-

tered flocks bred strongly for mutton might not do for Ohio with its large flocks of sheep bearing fine combing wool.

The tendency is for sheep to increase at the present time in Illinois. I shall be very much interested in the results of the next census if the prices for mutton and wool are maintained until it is taken. If you will go back a little way, you will find that a county in the northeast corner of the State of Illinois was once one of the greatest sheep counties in the Middle West. Now, it does not maintain many sheep. The dairying interests have crowded the sheep out. The same thing would be true around St. Louis, but I think if you take the regions outlying from these immediate vicinities around the cities that there is no competition between dairying and the sheep business. There may be some, but I should say that the strongest competition lies in the field farm crop. We have for the past 20 years been plowing our pastures up in the State of Illinois and turning our land to the growing of grain, and that has been the thing that has tended to reduce the number of live stock.

Large numbers of sheep and lambs come from the Mountain States into Illinois for feeding, but that is an industry separate from the farm flocks of which I have been speaking. It is not a negligible feature of our sheep business. I have always maintained that the fellow who feeds sheep in the State of Illinois is a sheepman almost to the same extent, though not quite, as the man who raises lambs in the West. He keeps that lamb for about half of its lifetime, and I think he should be reckoned in as a factor in the sheep business.

Commissioner CULBERTSON. I would like to have your judgment on why the Merino continues to persist in southern Michigan and southeastern Ohio, as distinguished from the development of mutton breeds in the farm States.

Mr. COFFEY. My feeling right along has been that the Merino is losing out in southern Michigan. In Ohio I am frank to say that conservation is a big factor in keeping as many Merino sheep as they have there. I believe in the report of the Tariff Board of 1911 it is stated that the workers of the Tariff Board found 8-year old wethers in southern Ohio. The only explanation for their existence was that these sheep returned to their growers and maintainers a little more than the crops cost on the farms where they were produced. Then there was a distinction made between what the crops cost and what the crops would have brought. I think the conservative element is a part of the reason why the Merino still persists in Ohio. But we must remember that in western Pennsylvania and eastern Ohio, particularly, the breed of Delaine Merino has been developed to the very highest point, not the stud flocks. I am not referring to them, but to the farm flocks which are run purely on a commercial basis. The type of agriculture and the nature of the wool, in my opinion, justify their keeping the Delaine Merinos. I believe that they are as good a farm flock as those people can find. They have mutton and they have beautiful wool. The Boston wool trade will tell you that the finest wool produced in the world, so far as spinning qualities are concerned, is grown in western Pennsylvania and in eastern Ohio.

There is a climatic and perhaps a soil factor involved. I think we have to remember that these men have developed a knowledge of the Delaine Merino sheep which is very significant. I have friends from that general region with whom I have talked recently, and they agree that the Shropshires and the Hampshires are making inroads on the Delaine flocks. These parties are firmly convinced—and they are not Delaine sheepmen, either, for that matter—but they are firmly convinced that the Delaine-Merino ewe will come back to her own in that region.

I think the farmers are keeping a better sheep than formerly, though you will get conflicting evidence on that point. Of course, we are doing all we c

but you must remember that the influence emanating from central headquarters is disseminated very slowly. We are talking about it enough, and we are demonstrating it all we can. But we have this other factor to deal with: Labor on the farm has been growing scarcer and scarcer. It has been harder and harder to get. The result is more and more difficulty in getting a flock adequately cared for. We are getting as many uncastrated, undocked lambs as we ever did on this market. That indicates one of two things, ignorance or carelessness. If it is carelessness it may be due to willful carelessness or because the farmer feels that he has not got the time to take care of them. Another thing, our flocks have been getting no bigger, except perhaps in a few instances: Since they are rather small, it is difficult to convince the farmer that he can afford to pay a relatively high price for a breeding ram. I think it is true in the northern two-thirds of the State that the breeding is better than it was, but in the south one-third I doubt it.

Commissioner CULBERTSON. Has the grading of wool by such organizations as the National Wool Warehouse & Storage Co. affected that movement at all?

Mr. COFFEY. It will, if it can be kept up. It tends to emphasize directly to the farmer the value and quality of fiber. I think there is a chance now, particularly if wool stays up in price, to get our farmers very much interested in that matter. I take my cue for the answer to that question from the experience I am having with my own students this year, 118 in number. We are doing some very simple wool grading in my class. The men have been very enthusiastic about the instruction received, particularly the sons of those farmers who happen to have flocks. One man summed it up in this way. He said, "This is fine stuff; we never knew before how to learn anything about wool. So far as judging sheep is concerned, we could do that without having it in the classroom, but this stuff we can not get any place else. It is the best thing we have ever run into." That is a sort of barometer, and it has been very encouraging to me. I do not know of another agricultural institution that is doing any of it. This is the first time I have ever done it, and why? Because under the old method of marketing wool in the farm States I saw no hope of making any such instructions effective. The wool was turned over to men that bought the paper, rags, and old iron, who did not know the grades of wool, and they made no difference in the price paid. What hope was there for me to teach those men that they should get a good price for the wool according to the merit of it. I could not do it. I have taken the very practical viewpoint of not teaching a thing until there is a chance to put it into operation somewhere. Now that we have started the movement I am going to put all the influence I can bear upon it to get the teaching of it in our agricultural institutions.

Mr. CONNOR. I would like to ask your opinion as to the effect of the failure to dock and castrate sheep on the value that men receive for lambs that come to market, say, after the 1st of September.

Mr. COFFEY. I should think it would amount, speaking in general terms, to a reduction in prices per hundredweight all the way from $1 to $3, with an average of $1.50. I think there would be a large loss in the weight of the animal. Beginning about the 1st of August the sex instinct of the ram lambs is developed and they fight among themselves. They chase the ewes in the flock and run a lot of flesh off of themselves and off the ewe lambs—not much, but some. The farmer loses a lot of mutton, or the possibilities for a lot of mutton. He also receives a reduction in the price received after the time you have mentioned. It is a significant matter and it is a question over which Mr. Holliday and I have had several discussions, but up to the 1st of July there is no reduction in the price for undocked and uncastrated lambs; but afterwards there is a whole lot of penalty put on by the packers. My conviction now, and for a long

time, has been that the average farmer ought to sell his lambs and get them out of the road about the 1st of July; that should be his object, for in so doing he does not have much competition from the West; he gets rid of his lambs before the hot weather. It is that, more than the docking and castrating, that I should like to see come to pass. I was down in the southern part of our State on June 6 last and I saw 85-pound lambs ready for the market, and yet those farmers were not shipping them out.

Mr. CONNOR. If the men here through the Middle West docked and castrated their lambs generally, do you think that those lambs could to any extent figure as feeder lambs?

Mr. COFFEY. No. There would be some worm infection. The native lamb should travel right from the farm on which it is produced to the slaughter shed. I think the farmer should adopt the policy of grading his lambs repeatedly, see that they are properly fed, and move them right off while they are young and tender lambs. Then if he has some extra feed he can buy western lambs and feed them on it. I do not think there is any argument about that proposition at all.

Mr. MCCLURE. With regard to marketing the lambs, there is a period, say, between the 15th of April and the 15th of June, when competition with western lambs is about eliminated. The run of fat-fed lambs, as a rule, is over about the 1st of May, and the range run does not start until June, the first train getting in here about the 24th of June. But there isn't any considerable volume of western lambs until the 1st of July. Don't you think that it should be the purpose of the farmer to put his lamb on the market in that period?

Mr. COFFEY. I do. I think every farmer south of the line that we might draw through the central part of Illinois can do it without a bit of trouble, and the men north of that line can do it. I think the hope of the farm sheep industry lies right there. Your work has demonstrated that the farmer at least can raise a better lamb without having it on grass too long. We should establish a practice like the following, which is growing very rapidly in the corn belt. Have the silos filled and an area of the farm devoted to growing alfalfa, those together with grain produced on the ordinary farm furnish the necessary feed. Have the lambs born in February or the 1st of March, feed the ewes liberally and the lambs as well, and then the lambs can come to the market weighing 65 to 70 pounds and get in before the 10th of June. That is more than they will weigh in August if they are held over under the old method of handling. I think that should be one of our chief objects.

STATEMENT OF MR. ROSCOE M. WOOD, OF DOUGLAS, WYO.

Mr. WOOD. I am interested in sheep in Michigan, where I have some in Washtenaw County. The prevailing type of sheep is the Merino. My observation of conditions there extends over all my life. The county lies in the southeastern part of the State, which was the earliest settled, and in the early days when the farmers first came there from the New England States and New York they brought sheep with them. It is rather a rolling agricultural section. These old New Englanders were good sheepmen; they were high-class farmers, and they brought with them and imported a great many Merino sheep from Vermont and other parts of New England. The fact that they did bring in those Merino sheep and the high prices for wool that were paid during the Civil War period from 1860 to 1870 caused the formation of a great many flocks of pure-bred Merino sheep. As a matter of fact, there was a time in the years following—I might say the two decades that followed the Civil War—from 1870 to 1880 and from 1880 to 1890 when a great many farmers put in pure-bred flocks and their neighbors bought rams from them to maintain a distinct Merino type.

Commissioner CULBERTSON. Were those Delaines?

Mr. Wood. No; they were not at that time. They were what are now known as Vermont Merinos. They considered a heavy weight of fleece the main object of sheep raising at that time. Incidentally, that was the cause of the decline in the following decade from 1890 to 1900. They did not switch quick enough; they did not realize the increasing importance of mutton and the decreasing importance of wool, owing to the drop in the prices of wool during that decade. They did not realize it sufficiently to change the type of their sheep. Many of them, when wool went to practically nothing and before mutton had become really an important product, gradually closed out their flocks absolutely instead of changing the type of sheep.

Following that, however, or rather almost contemporaneously with it, there were farmers who had come in in place of these other men—not their sons—but men of a different class, who took up with the Delaine Merino, and in the western part of the county there has been an organization, with its headquarters in Eaton County, which is northwest of Washtenaw. The breeders have maintained this organization right up to the present time, and it has been a very important factor in the farm sheep business. It is the Improved Black Top Merino Sheep Breeders' Association.

The type of Merino is localized in small sections and governed considerably by the character of the pure-bred flocks. There is a section in the western part of the county where these Black Tops predominate and the general farmer has used a Black Top ram on his ewes to produce Delaine wool. For example, the Chelsea wools—that is a name of a town which is practically the center of this locality—are known in the Boston wool trade as being an unusually high-class Delaine wool. In the section where my people lived some of our neighbors have raised Rambouillets to quite an extent, and that has influenced the general farmer to breed from the Rambouillet type of Merino. They have a little heavier carcass and a little coarser grade of wool.

The Merino types have predominated in Washtenaw rather than the mutton types, probably because of and the influence of the older men who are maintaining their Merino flocks, the climatic conditions, and the not too favorable experience of farmers who used the coarse-wool breeds.

In addition to that there should be considered also another factor which is of considerable importance in that connection, and that is a coarse-wool lamb should be marketed when he is 3 or 4 months old. Farmers who keep sheep raise considerable rough feed—cornstalks, straw, and hay—for which they have no market except through their live stock. That section never developed into a cattle-feeding section. The fact that these men wanted to convert their rough feed into a marketable product made them desire to do it through their lambs. They found that the Merino lamb could be shorn when 11 or 12 months old, along in the spring, and would finish out to a marketable weight, a desirable weight, and bring a good price, and they would have the fleece as the product of their rough feed and have it in merchantable form. That seems to me the main reason for keeping the Merino flocks. To give a concrete illustration, I know of one man there in our section who has kept a flock of Merino ewes intact for over 20 years. He has never bought any ewes, but has kept his ewe flocks good and improved them with his own ewe lambs. He has followed this method of marketing his lambs at about 12 months old and has made more money on the capital invested and the labor invested than any other man in that section of the country, so far as the farm end of it is concerned.

The coarse wools have been used in the eastern end of the county and have not been successful in the real sense of the word—perhaps due to other conditions, however. This whole business can not be summed up in one little thing

or in one determining factor. The nearness of the city of Detroit and its rapid increase in population has been a factor which has affected the sheep business on the farms there. The eastern end of the county is close to Detroit, which perhaps has had something to do with it. However, there is one other factor that has entered into the sheep business, and it is this: The stomach worm has been the great enemy of the sheepman, and the coarse-wool breeds are a great deal more susceptible to the stomach worm and a great deal more damage is done by the stomach worm to the coarse-wool breeds than to the Merino breeds.

In general the system of sheep husbandry which I have described predominates throughout the southern part of Michigan. Of course, in different sections there have been different phases of the industry. There are sections where the sheep business has practically developed into nothing but a purely feeding proposition. For instance, Shiawassee County and Hillsdale County is a feeding proposition, and there is a great deal of feeding done in Lenawee County, in the northern part. There, of course, it is a different proposition entirely. It is practically confined there to a purely feeding and fattening operation.

Incidentally I might remark that on the southern border of our county is a section, the first section in the State of Michigan to develop the western lamb-feeding industry. I am well acquainted with the man that shipped in the first carload of western sheep into the State of Michigan for feeding purposes. He was James Hogan, of Clinton, Mich., in Lenawee County, bordering Washtenaw County on the south. He made the shipment in 1891.

Commissioner CULBERTSON. Are you acquainted with the problems of the sheep industry in the so-called cut-over lands of Michigan?

Mr. WOOD. To a certain extent I have had experience there.

Commissioner CULBERTSON. Just state your opinion as to the future of the sheep industry in that section of the State.

Mr. WOOD. From my own experience, which was very unsatisfactory, I would say there was very little outlook for the sheep industry. However, there are certain sections in the northern part of the lower peninsula where the sheep business has been fairly successful, where the lands have been cleared and developed under a farming condition pure and simple, and where the soil was favorable. For example, there is a section around Traverse City and then a trifle north of Alpena where I have knowledge of one successful sheep operation upon a small scale. In other words, using it purely as a farm proposition, it is all right, but as far as big bunches are concerned, in my estimation there is absolutely nothing to it. I believe I am borne out in my statment by the experience of the men who attempted this experiment during the year just closed.

Where sheep raising has been made a success on what is called the cut-over land it has been purely a farm development, where the land has been cleared, the stumps taken off and sown in clover and handled as a purely farm proposition. As a matter of fact, my own experience was with the idea of demonstrating the success of a proposition of the migrating character. We had a farm in the southern part of the State, and we figured that we could winter in the southern part of the State and pasture in the northern part of the State; that it was a short shift and if we could do it, fine and dandy; but it didn't work out.

The bulk of the fine-wool lambs are fed on the farms where raised, or else they sell them to the commercial feeders. For example, we will say in the neighborhood there is somebody that believes in using Shropshire rams and raising coarse wool lambs. Those lambs almost invariably go to the summer markets. The lambs that are carried through the winter to shearing are Merinos and grow enough wool to make a profit for their feed. They do not require a heavy

grain ration. The dogs have been bad and might be considered as a deterrent factor in the business in some sections of Michigan. They have driven men out of the sheep business. A man has a flock of ewes, and a strange cur comes along and kills them off. He then goes to work and tries to rebuild his flock, but in about a year and a half perhaps another stray cur will come along and kill them off, and then he is about ready to quit the sheep business.

With reference to displacement of cows by sheep, my knowledge is that in the northern and central part of the peninsula that condition has obtained, to a certain extent, where the dairy products were not close to a market. I understand up in the central part of the State they have gone into sheep within the last two or three years on account of the scarcity of labor; that is, of course, where they can not ship the milk and cream.

To a considerable extent in localities especially favored with transportation to the large centers of population, dairy cows have driven out sheep. For instance, Livingston County 10 years ago contained a considerable number of sheep, and it has become at the present time one of the leading centers of dairy cattle in the United States, due to the fact that it is close to the city of Detroit. Livingston County now is a great Holstein center. Changes in Oakland County have been due to other factors than dairy cattle. It has been due to another movement—I do not know whether this would be germane to the discussion or not, but it has been because of the fact that a great many wealthy Detroit people have gone out there and bought country estates.

Mr. CONNOR. To what extent has dry edible-bean production in south central Michigan, right in the old sheep section, helped to maintain sheep?

Mr. WOOD. That is rather a long story relating to the development of the sheep-feeding industry. The sheep-feeding industry was brought in on the worn-out wheat lands, lands which were wheated year after year and had lost their fertility. They brought in these lambs and fattened them and used the sheep manure for fertilizing, and then they started in the bean-growing proposition. You can grow a crop of beans in the summer and put that same piece of land into wheat that fall. The beans are marketable at a good price and they leave a valuable product on the farm—the fodder—and the most profitable source of disposing of the fodder was through sheep. It is better feed for sheep than for any other live stock; in fact, they are practically the only live stock that will make a practical use of bean fodder. You will find the bean growing in the feeding sections, for example, in Shiawassee County. Wherever you find the bean pods you will find sheep feeding, simply because the sheep use them better than any other live stock. In fact, that is the only way they can dispose of the fodder, and it makes valuable feed when handled in that way.

FURTHER STATEMENT OF MR. JOHN D. HOLLIDAY, PRESIDENT OF THE WAREHOUSE & STORAGE CO., OF CHICAGO, ILL.

Commissioner CULBERTSON. On account of the fact that your knowledge of the industry is so extensive, I would like to know what your judgment is as to the reason why the fine wools have persisted in southeastern Ohio, West Virginia, and west Pennsylvania, and also in Michigan?

Mr. HOLLIDAY. Broadly speaking, the Merino was the first settler, and they have continued through good and ill report to give a reasonably good account of themselves. The economic issue involved in producing a maximum of high commercial wool with to some extent a fair compromise on the mutton end, combined with long life, the high average of healthfulness, a larger percentage of resistance to all internal enemies of the sheep in the way of disease and things of that sort, a better adaptability to the domestic side of life, are all strong factors in the persistence of the Merino.

The close proximity of large centers of meat consumption, large cities, where the farmers find more or less ready market for meat products, whether in the form of lamb or ewes, has given an impetus to the mutton type.

I do not feel that my opinion or judgment is worth while as to the breeds of sheep in the farm States, because I have noted them purely from observation. My practical experience has always been on the range. But I think there is a real economic reason for the Merino sheep in the Ohio section. My own view is that the Merino ewe has come to stay as a very high priced animal in the farm States, by reason of the scarcity of production and her outstanding economic advantages in producing. I am disappointed at the poor showing that the Merino breeders have made in the International. It is one of the peculiar things that when you come down into this country the Merino men are the fellows who have been in the business longest. The feeder, the fellow that raises for the mutton, gets in and then goes out again, but those in the Merino business are the men who stay with the business. From the present period on I think there will be a rather sharp reaction in favor of the Merino sheep. I believe the Merino wool will remain at a high price for a long time.

I feel that in the long run this country will look to foreign sources for a large part of its very fine wool production. The desire to combine meat and wool on the same sheep will result in widespread attempts, with more or less success, to combine the large frame sheep, the rugged sheep, with a fair amount of production. But you get medium and low wools from sheep of that character.

I would like to add that I think the Department of Agriculture has given very useful service in connection with the biological survey, which has given attention to condition of soil, grasses, altitude, water, climate, and adaptability of the different breeds of sheep. A great deal of waste is encouraged in the breeding of sheep by the enthusiasm of certain breeders for a certain type of sheep. They will urge the purchase of those sheep to be located under utterly impossible climatic and soil conditions, conditions that they were never expected to meet, and the result in a majority of cases has been disappointment. An intelligent study of the basic conditions would have prevented that waste, disappointment, and loss; an economic waste in any line can never be defended.

Beyond a certain point you will find that the producer of wool and the buyer of wool will have to meet on some compromise. The buyer of wool in the grease is always figuring on trying to get the largest amount of clean content out of his purchase. For instance, in the collections of wool that we have here, there are some wonderful Geelong wools that were sent by the Australian Government to the exposition in California. We purchased that wool from the Australian Government there. It was beautiful Australian spinning quality, 70's and 80's, wonderful stuff, clean, soft, with high felting qualities. The price paid for that wool in the grease was not commensurate with the value of the scoured wool. The grower did not receive nearly the value of his wool. Therefore, beyond a certain degree of fineness, the man who grows wool can not afford to produce that wool unless he receives a high price. The finer your wool and the more pronounced its felting qualities, the more you must reduce the sheep's value for meat. It is the other way around when you are producing mutton, and that is why you do not get very high grades of wool from mutton sheep. You leave the vitality of the sheep in the carcass. It is not extracted in the wool. Therefore, beyond a certain point, except in a sentimental way, they will not be given to excessive production of fine wool in this country. I think, to use a spinning term, that 64's represents practically all of our Montana wools and practically all of the western wools. With a great many of our farm wools, Ohio and western Pennsylvania wools, they get to

very high spinning count, but there is only a small amount produced, and I should say the average would be around 60 to 64. When you get down to the half bloods, to three-eighths blood, and to quarter blood (46's), you have, from the 46's to 64's an unassailable commercial line of wool that will answer very well for all commercial uses, besides being produced on a very good type of sheep.

Mr. WOOD. Will not the finewool production be increased in certain sections of the range country if the grower can get the commensurate price for the product; that is, if he can get a high enough price he will raise the fine wool?

Mr. HOLLIDAY. If the price of lambs doesn't go still higher, he will probably go into that. The lamb is so much easier to produce than is the wool. He probably would not be able to abide the price which the wool trade would say was high enough.

I think that the Merino is coming into its own, but always under protest. When the black-faced lamb starts down the Union Pacific, and tops the Chicago market, there is always a kind of regret on the part of the sheepman that he did not have the big lambs instead of the little Merinos. I have been interested in Montana for a good many years and was one of the first Montana men that began to buy his own range. For more than 10 years I have never used an acre of public range. It has become a question of mathematics—of how much each acre of land will produce. I was in Mr. Wood's country a good many years ago buying bucks, and I have been in Ohio buying bucks; in fact, I took the first Rambouillet buck to Montana, in 1897, and also the first Hampshires, which have always been a favorite of mine in the mutton type, in 1907.

My range was in no way adapted to Hampshires, because of the dry Buffalo grass. They had no summer range. I didn't try to fool myself at all. It was only a couple of years before a friend visited me. He used to buy what is called the "knot-head" Merinos. I had about 300 Hampshires. He asked me how I was getting along, and wanted to know if I would sell them, and asked me what I would take for them. I asked him what he would give me. He said $7 a head, and I had paid $10 to $12. He took them down a couple of hundred miles, and has built up quite a nice flock of Hampshire sheep.

I think that Montana is the home of the Merino sheep, with the exception of a few areas. We have the dry Buffalo grass, a rich grass, with not many weeds. The Merino is adapted to closer herding. You can handle the same number of sheep in a pasture with 25 to 30 per cent less area than any other breed of sheep; they are adapted to domestic handling better than any other grade of sheep, and will give a better quality of wool than the same sheep bred in Nevada, Utah, or Wyoming. The reason for that is the soil. The alkali in the larger part of the Montana ranges is kept neutral by reason of the heavy stand of Buffalo grass; it is not stirred up so much by the feet of the sheep and does not get in the wool so much. The snow which is gathered by the wool on the sheep when melted does not cause a chemical action between the dampness and the alkali in the wool, which has a drying effect on the wool. We have a sufficient amount of alkali, however, to give bone and constitution; we have the proper elevation; and, generally speaking, I think it is the most healthful range country in America.

STATEMENT OF MR. L. L. HELLER, ASSISTANT SECRETARY NATIONAL WOOLGROWERS' ASSOCIATION, CHICAGO, ILL.

Commissioner CULBERTSON. Will you state what the National Wool Growers' Association is doing in the interest of increasing public interest in mutton?

Mr. HELLER. Last spring—in February, I believe—$10,000 was set aside to increase interest in lamb. A brief survey of the field had shown that the

average American eats about 71 pounds of beef, 67 pounds of pork, to every 7 pounds of lamb and mutton combined. The association had for a long time thought that this neglect of lamb was one of the limiting factors of the sheep industry.

The percentage of lamb and mutton of the total per capita meat consumption in the United States is about 3 to 4 per cent, and in England it is about 20 to 22 per cent. Those figures are approximately correct. Just a few years ago the per capita consumption of mutton and lamb in England was 26 pounds, as against about 7 in this country. The English population has been trained to eat frozen lamb, and I think that is one factor. They import large quantities of New Zealand lambs. Their native lambs are no better than our western lambs. I think our western lambs are equal to any in the world.

We have done as much publicity work as possible. We have worked in connection with the different State universities by way of having demonstrations and lectures on the subject. We have cooperated with the packers to solve this problem, which, we feel, is as much their problem as it is ours, and they have bought a considerable number of our bulletins, at cost, to distribute to people whom they think would be interested. I refer to the bulletin "Whetting Uncle Sam's Appetite for Lamb," published by the National Wool Growers' Association at Salt Lake City, Utah. That was published in February, 1919. We have placed thousands of copies of the bulletin in the hands of the domestic science and other teachers in the agricultural colleges and at the various secondary schools.

The problem of educating the American people to eat lamb is as much a problem of the hotels as it is a problem of the average home. In the large cities the hotels serve lamb, as a general rule, quite regularly. In the corn-belt towns and cities you rarely see lamb on the bill of fare. We have worked with the butchers to some extent. Swift & Co. have seven men in the field at the present time demonstrating new ways of cutting and preparing lamb for use. There has always been a popular prejudice against lamb. A great many people think that it has an objectionable flavor. I think the substitution of other meats for lamb is responsible for that in a majority of cases. At the height of the season I believe there are 3,000 goats coming into Kansas City market a day, and I have never seen any goat chops for sale. There also is a popular impression among many people that lamb is a high-priced meat. At certain seasons of the year it is, but when the main crop is marketed it is often cheaper than other meats. Certain cuts of lamb sell all out of proportion to other cuts. I have made a study of the price of lamb compared with other meats in this country, and at the season of the year when the big crop is coming on it is favorable to lamb.

In this work of popularizing lamb, a lamb drive was held at Duluth for two days at the time of the meeting of the Northern Minnesota Sheep Breeders' Association, and a display was put on at the local cooler and the daily press called attention to the show. During the week that this display was on the sale of lamb was increased in Duluth from about 300 to 1,600 carcasses.

Mr. McCLURE. I want to develop the point that our reason for trying to bring about an increased consumption of lamb was that we felt that the present supply was already in excess of the demand, and we did not have a satisfactory market for the number of lambs that we already had. Therefore, we must create new markets by increasing the demand.

Commissioner CULBERTSON. There is an increasing emphasis being placed on mutton production in Australia and in other wool-growing areas, which may produce competing mutton in this country.

Mr. McCLURE. Exactly. We felt that the number of sheep raised in any one country would depend largely upon the profit that might be made from them;

that we must, therefore, increase consumption and in that way bring about an increase in the sheep production.

Commissioner CULBERTSON. You have heard the general discussion of the Ohio and Middle States situation, and I would like to have your opinion on some of the points that have been raised here.

Mr. HELLER. Before I went to the National Wool Growers' Association I was connected with the Government for three and one-half years in the Animal Husbandry Division of the Bureau of Animal Industry. That gave me an opportunity to become fairly well acquainted with the sheep industry generally. I traveled all over the United States. As to Merinos, I think there is much conservatism on the part of the Merino men. There is another factor that has not been brought out. The sheep industry in Ohio is very largely a matter of permanent pastures, which mean stomach worms. Merino sheep, I think I am pretty safe in saying, withstand the attack of stomach worms better than any other class of sheep. That has been one reason why the shepherds have stayed with the breed. Possibly another factor has been that much of that country in southeastern Ohio will not produce a fat lamb, and because of that the wool crop has represented possibly a larger percentage of the income of the flocks than in many other sections of the country, and for that reason they have given more attention to the wool. In the farm States generally, however, I think the tendency has been and is toward the mutton type or the cross-bred type. From personal knowledge, it does not seem possible to me to develop a dual purpose sheep that will produce either as high quality of wool as a strictly wool breed or as high quality of mutton as a strictly mutton breed, but a profitable animal that produces a good quality of both has been evolved in the farm States.

Take the cross-bred western ewe, the Lincoln or Cotswold-Rambouillet crosses, such as go out to the farms by the thousands from the stockyards every year. They use a Down buck on that ewe. The ewe gives a good merchantable fleece of good weight and quality, and the lamb makes a very good lamb, not as good as the high-grade Southdown flock would turn out or the high-grade Hampshire or the high-grade Shropshire, but a very good lamb, nevertheless. I think such an ewe has a distinct place in the farm States. I do not know just how to put it, but the reason that there are not more pure-bred mutton flocks in the Middle West has possibly been that there is not in this country a distinction drawn between mutton of very good quality and mutton of the very best quality.

You get varying reports about the western ewes, but in the main they are favorable. I have run across instances where men who knew little or nothing about sheep have taken out these western "gummers" and their venture has, almost without exception, resulted disastrously. I do not think, however, that that has hurt the reputation of the western ewe. The fact that they are so free from parasites is one factor that has made them popular. The losses occurred with men who virtually were greenhorns, and it was due to their own ignorance of the sheep business.

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